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ABSTRACT

California University of Pennsylvania developed Project Technology Education Curriculum Help (TECH) for two school districts in Western Pennsylvania. Six objectives were achieved: (1) organized two pilot school districts to serve as curriculum models in technology education for other schools throughout the commonwealth; (2) established California University as a resource center for the dissemination of curriculum materials in technology education to interested school districts; (3) developed a demonstration curriculum development project in two public schools; (4) modified the Industry and Technology Curriculum Plan to include competency-based education that fits the resources and needs of schools; (5) provided a vehicle for articulation efforts among secondary and postsecondary institutions providing technical education in Southwestern Pennsylvania; and (6) evaluated the success of Project TECH, its ability to provide significant resources for area schools, and its use as a model. The bulk of the document consists of six appendices as follows: (1) questionnaires and report of a survey of Southwestern Pennsylvania school districts on the status of technology education programs; (2) sample third-party articulation contracts; (3) course outlines and sample technology activities for grades seven (exploring technology), eight (applying technology), and nine (technological enterprise); (4) letters of support for continuing Project TECH; (5) Project TECH progress report for Chartiers-Houston school district (Pennsylvania); and (6) Project TECH project report for Cannon-McMillan school district (Pennsylvania). (NLA)

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Project TECH

(Technology Education Curriculum Help)

(Contract Number [redacted]

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Dr. Joseph Pecosh

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CALIFORNIA UNIVERSITY OF PENNSYLVANIA

CALIFORNIA, PENNSYLVANIA

July 1, 1987 - June 30, 1988

PENNSYLVANIA DEPARTMENT OF EDUCATION

BUREAU OF VOCATIONAL AND ADULT EDUCATION

VOCATIONAL PROGRAM SUPPORT SERVICES SECTION

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I. ACKNOWLEDGEMENT AND CONTENT PAGES

ACKNOWLEDGEMENTS

As Director of Project TECH, sincere appreciation and gratitude is extended to Dr. David McCrory, chairman of the Technology Department, West Virginia University for lending his support and expertise acquired from his involvement in Project Open developed in the State of West Virginia. And to the graduate assistants from West Virginia University and California University of Pa. for their professional conduct, compentency and contributions in the development of technology education materials needed in this project.

Appreciation is extended to the administrators and technology teachers in the Chartiers Houston and Canon McMillan school districts: in particular, to the administrators for providing administrative and financial support to the project, to the teachers for their cooperation, professional expertise in helping to make this project a reality in their respective school districts. Further, thanks is extended to the advisory board members of each school district by their participation, advice and encouragement towards the goals of this project.

Special thanks is extended to Dr. John Wright, Associate Dean of the College of Science and Technology, for his help and support in initating this project.

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II. FINAL REPORT SUMMARY

A. Abstract

Dr. Joseph Pecosh
Dept.Industry and Technology
California University of Pa.
California, PA. 15419

85-8052 Project TECH (Technology Education Curriculum Help)

July 1,1987 to June 30,1988 $ 40,000

The purpose of Project TECH were to develop and infuse a pilot technology education curriculum into two school districts in Southwestern Pennsylvania and to establish California University of PA. as a resource center for the dissemination of curriculum materials in technology education to interested school districts in the State of Pennsylvania.

OJECTIVES PLANNED

The plan objectives of the project were to:

1. conduct a needs assessment of technology education curriculum materials and services for public schools in Southwestern PA. by August 1987.

2. coordinate curriculum and instructional resources development efforts for the public schools of Southwestern PA beginning by September 1987 and on-going.

3. establish a demonstration curriculum development project in a least 2 public schools; beginning by September 1987 and on-going.

4. modify the Industry and Technology Curriculum Plan to include competency-based education (CBE) that fits the resources and needs of LEA's in Southwestern PA; beginning by January 1988 and ongoimg.

5. provide a vehicle for articulation efforts among secondary and postsecondary institutions providing technical education in Southwestern PA. (LEA's, AVT's community colleges, private schools, universities, etc.) beginning by July 1987 and on-going.

6. evaluate the success of Project TECH, its ability to provide significant resources for area schools, and its use as a model by June 1988.

OBJECTIVES ACHIEVED

1. This objective was achieved by establishing two advisory boards for Chartiers Houston and Canon McMillan school districts on technical education with representation from education and the private sector.

   Letters of support were received from school administrators and technology teachers who participated in teacher enhancement centers and identified a need for help of the nature provided by Project TECH.

   An indepth study was conducted by Larry Collins, a graduate assistant working with Project TECH at CUP, of all the school districts from intermediate units 1,2,3,7 and 27 in Southwestern PA. A similar study was conducted of all intermediate units in Northwestern PA. and several others in Central PA. and the result were nearly the same as those of Southwestern PA. (See Apendix A)

2. This objective was achieved by establishing a technology education resource center at CUP and supported by a Project Director, a part time secretary and two graduate assistants.

   State Departments of Education from all 50 states were contacted either by telephone or mostly by correspondence for the purpose of obtaining curriculum materials relative to industrial arts/technology education. Approximately 42 States responded and nearly one-half sent curriculum materials.

   Most of the curriculum materials in the technology education resource center at CUP were purchased or given freely from Pennsylvania Department of Vocational Education, California University of PA, West Virginia University's Technology Center, Ball State University's Technology Education Curriculum Center, New York State Department of Education, Indiana University of PA's Technical Center, NASA Langley Tech Center, Mid America Vocational Consortium and ITEA's National Office.

3. This objective was achieved by subcontracting with West Virginia University and applying their Project Open infusion model into two local school districts with the assistance of two university doctoral students who each provided 20 hours of work one in each of the two school districts.

Two school districts, Chartiers-Houston and Canon McMillan, entered into contract with CUP to act as demonstration sites for technology education that could later be used as model schools. (See Appendix B)

4. This objective was achjeved by writing and implementing a 7th,8th and 9th grade technology curriculum in the system areas of communication, manufacturing, construction and transportation for the two contracted school districts. The implementation of these system areas are at various stages of development in each of the contracted school districts and are currently perceived as program drafts that are being refined this coming academic year.

   The suggested technology learning activities (TLA) accompanying the proposed technology course outlines have been adapted from various sources identified in objective 3. Those activities that are copyrighted and printed herein as examples are done with the permission from the publishers. (See Appendix C)

5. This objective was achieved by conducting organizational meetings with administrators, technology teachers, advisory boards and between staff personnel of Project TECH and Project OPEN. The outcome of these meetings is vested in producing a viable technology education curriculum previouly mentioned in objective 4. For additional information refer to: (See appendices E & F)

6. This objective is achieved by the letters of support from superintendents and teachers involved in the program in continuing Project TECH. (See Appendix D)

B. Financial Summary

The financial report of this project is filed separately by the financial division of the university on forms TPE 2011 and 2012.

III. PROJECT APPROACH/METHODOLOGY

California University received a federal grant through the Bureau of Vocational Education to develop and infuse a technology education curriculum program into two school districts in Western Pennsylvania. The program is called Project TECH an acronym for Technology Education Curriculum Help. Although the project grant is funded on a yearly basis it was designed to be a multi-year project with a realistic goal for completion closer to three to five years. The program has two primary objectives. The first objective is to establish two pilot school districts to serve as

curriculum models in technology education for other schools throughout the Commonwealth. The second objective is to establish California University as a resource center for the dissemination of curriculum materials in technology education to interested school districts in the state of Pennsylvania.

Relative to the first objective, Chartiers Houston and Canon McMillan school districts have agreed to participate in the program. Although they are adjoining school districts and serve the needs of similar type of students each district has unique differences. Chartiers Houston is presently in a stage of constructing new laboratories in its Jr.-Sr. High School while Canon McMillan has fully operational and comprehensive industrial arts laboratories. In both school districts, however, their respective school boards, superintendents and IA/TE faculties are committed to developing a Technology Education Program.

Project TECH is an ambitious program that deals with a philosophical as well as technical change in curriculum and at the same time addresses a change process that impacts upon teachers and students whose understanding and perception of the new curriculum need to be nurtured in creative and constructive ways. To assist in this venture California University has entered into partnership via a sub-contract with West Virginia University that has considerable expertise in infusing technology education into schools throughout the state of West Virginia with its PROJECT OPEN curriculum model that has been tested and refined over time.

To assist in Project TECH at the classroom level and serve as curriculum specialist are two technology education doctoral students from West Virgina University. The specialists work alongside of the technology education teachers and help them develop curriculum, courses, activities, visuals, hand-outs for each new pilot course. The curriculum model is the INDUSTRY AND TECHNOLOGY MODEL developed by Drs. Tom Wright and Len Sterry. It provides instructional strategies, content, and activities in communications, manufacturing, construction, and energy/transportation content areas. The specialists will assist in developing competency-based units of instruction and will articulate the curriculum from grades 7 through 14 including a pathway through the Area Vocational-Technical School and onward to a technical community college.

The INDUSTRY AND TECHNOLOGY MODEL will be modified to fit the needs of the Technology Education Program guide developed for the Pennsylvania Department of Education and Technology Education Association of Pennsylvania by a group of individuals from the state university system, public school, Pa. Dept of Education and TEAP. This curriculum program has been accepted by the profession and TEAP and will meet Objective 1 of their Professional Improvement Plan, "Exhibit B" that states:

By October 31,1990 Pennsylvania will have a nationally recognized technology education curriculum implemented by awards for excellence in teacher education programs, public school programs, and teaching. (p.2)

The second objective of Project TECH is to develop a ready resource of curriculum and instructional materials for distribution in Western Pennsylvania. To assist in this endeavor are two technology education Master Degree students from California University who will act as project assistants and collect, organize, develop, duplicate and distribute the appropriate vocational and technology education materials to support all technology teachers at the Jr.-Sr. High School levels. Additionally, they will provide in-service training and technical assistance to technology education teachers in the previously identified school districts. Materials will be gathered from sources thoughout the nation particularly from the Pa. Dept. of Vocational Education, California University of Pa., West Virginia University's Technology Center, Ball State University's Technology Education Curriculum Center, the Ohio State University's National Vocational Education Research Center, NASA Langley Technology Center and ITEA's National Office.

Pursuant to this task three additional TEAP sub-objectives of their Professional Improvement Plan will be addressed:

1.3 By June,1987, the Industrial Arts/Technology Education curriculum materials that are consistant with the new curriculum model shall be developed. (p.2)

1.4 By November, 1988, an implementation strategy for IA/TE curriculum model shall be in place. (p.3)

7.3 By October 31, 1988, establish at least two pilot local or regional advisory groups within Pennsylvania to act as models for future developing groups. (p. 9)

The overall project director is Dr. Joseph Pecosh, California University of Pennsylvania who also serves as co-director with Dr. David McCrory of West Virginia University in implementing and infusing curriculum materials into the two school districts.

IV. PROJECT SUMMARY

The purpose of Project TECH was to develop and infuse a pilot technology education curriculum into two school districts in Southwestern PA and to establish California University of PA as a resource center for the disemmination of curriculum materials in technology education to interested school districts in the state of PA.

Project TECH is an outgrowth of a need established in the profession because of a rapidly changing technology experienced in our technological society and its subsequent impact upon our culture and life style. This change then was reflected in the knowledge and skill that needed to be taught in the classroom to students if they were to function successfully in a highly competitive world market. Clearly, our nation was moving from a goods producing society to one of information producing. Industrial arts/technology teachers realized that the skills they learned at the time of their graduation now have become dated and that in-service initiatives were a must. To meet this challenge several school districts in Southwestern PA pooled their financial resources and approached California University to provide in-service training to math, science and industrial arts/technology teachers that resulted in the development of the TEACHER ENHANCEMENT CENTER CONCEPT. The program was unique because it provided one day per week for 15 weeks of intensive in-service education on such topics as motivation, teacher burn-out, testing, curriculum and instructional design, content update, competency based education and interdisciplinary curriculum opportunities. As a follow-up to this successful program superintendents and teachers requested support services in helping school districts make curriculum changes in the area of industry and technology which would reflect a more modern approach in teaching technology. However, it was an impossible task for in-service teachers to teach six periods per day, keep the laboratory in working order, provide the school with extra-curricular support and write curriculum and instructional plans. All the enhancement in the world will not make up for lack of time and exhausted energy. This is were Project TECH (Technology Education Curriculum Help) assisted in bridging the gap between theory and practice. The project provided for curriculum specialists (doctoral students from WVU and Master graduate students from CUP) to work alongside of technology education teachers and help them to develop curriculum, courses, activities, visuals, hand-outs for a new pilot program.

Project TECH has completed its first successful year and has gained a wealth of information and experience in implementing change in a school program. Presenting teachers with a complete curriculum guide is not enough;

they need support services that impact upon attitude adjustment, learning new technical skills, and assurance that they are moving their curriculum in the right direction.

Not only is the experience and curriculum materials shared among teachers participating in this project, other technology teachers will be the benefactors as information is disseminated throughout the commonwealth.

11-12-87

PROJECT TECH / PROJECT OPEN

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APPENDIX

A

CALIFORNIA UNIVERSITY
of Pennsylvania

CALIFORNIA, PENNSYLVANIA 15419

COLLEGE OF EDUCATION
(412) 938-4125

February 27, 1987

Dr. John Wright, Associate Dean
College of Science and Technology
California University of Pennsylvania
California, Pennsylvania 15419

Dear Dr. Wright:

As you well know the College of Education has been involved, for the past two and one half years, in an innovative professional development project. In this project, entitled Teacher Enhancement Center, we work with science, mathematics and industrial arts teachers in school districts in Washington and Fayette Counties. One purpose of the project is to institute curriculum revisions in Industrial Arts converting the present curricula to one with emphasis on Technology Education. It is my considered opinion that we have made substantial progress in this area. Several school districts in Washington County are on the threshold of a major committment to Technology Education. It is abundently clear to me, from conversations with superintendents in these districts, that the project you are proposing will make a major contribution to this conversion process.

In our work in the Teacher Enhancement Center, we have indeed taken the important first step. We have introduced the concepts of Technology Education, we have created a cadre of enthusiastic teachers, and we have convinced school superintendents of the importance of this concept. Your proposal, if funded, will continue the process and will surely have a major impact on the curriculum of schools in our service area.

The College of Education fully supports your proposal and sees it as a natural extension of our present efforts in in-service education.

Sincerely,

William R. Benedetti

William R. Benedetti, Dean
College of Education

12

Trinity Area School District

PARK AVENUE, WASHINGTON, PENNSYLVANIA 15301

DONALD E. HARTSWICK
SUPERINTENDENT OF SCHOOLS
412/225-9880

February 9, 1987

Dr. William R. Benedetti, Dean
College of Education
California University of Pennsylvania
California, Pennsylvania 15419

Dear Dr. Benedetti:

I strongly endorse your proposal for Phase II of the Teacher Enhancement Center concept. We have a serious need to provide better and more teacher education, on an inservice basis. The addition of a consultant to assist in course development at the local level would be fulfilling an important aspect of the program.

Our success in this program depends upon the successful expansion of consultant-type services. May your search for additional funds be fruitful.

Sincerely,

Donald E. Hartswick

Donald E. Hartswick
Superintendent

DEH/sh

"BIG MAC"

Canon-McMillan School District

PHONE: 412-746-2940

OFFICE OF THE SUPERINTENDENT
1 NORTH JEFFERSON AVENUE
CANONSBURG, PENNSYLVANIA 15317

DR. DONALD STRANG
SUPERINTENDENT

DR. JAMES S. JOHNSTON
ASSISTANT SUPERINTENDENT

LOUIS J. POPIOLKOWSKI
ADMINISTRATIVE ASSISTANT

JOHN G. FRANJIONE
SECRETARY
BOARD OF SCHOOL DIRECTORS

February 5, 1987

Dr. William R. Benedetti, Dean
College of Education
CALIFORNIA UNIVERSITY OF PENNSYLVANIA
California PA 15419

Dear Dr. Benedetti:

Our school district wholeheartedly supports the College of Education of California University of Pennsylvania in your efforts to obtain a grant to fund Phase II of the Teacher Enhancement program.

The staff from our district has grown professionally in their involvement with the project. Our Industrial Arts teachers, especially, are anxious to continue our move toward Technology Education. We need to develop a Technology Education Curriculum. Your proposal to jointly develop it for the school districts in our area, along with the resources of your School of Education, is a most efficient way to accomplish this task.

You have our total support. We eagerly look forward to the opportunity to work with the University in the continuing attempt to improve our Technology Education Program.

Sincerely,

CANON-McMILLAN SCHOOL DISTRICT

Donald W. Strang

Donald W. Strang
Superintendent of Schools

DWS/sae

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School District of the City of Monessen
MONESSEN ELEMENTARY CENTER
ROSTRAVER STREET AT WATKINS AVENUE
MONESSEN, PENNSYLVANIA 15062-1295

THOMAS C. WILKINSON, PH. D.
SUPERINTENDENT

AREA CODE 412
684-3600

February 9, 1987

Dr. William R. Benedetti, Dean
College of Education
California University of Pennsylvania
California, PA 15419

Dear Dr. Benedetti:

This letter will serve to express my support in your efforts to obtain funding for Phase II of the Teacher Enhancement Center concept.

The School District of the City of Monessen recognizes that there is a need to revamp our current Industrial Arts Program in order to bring it into conformity with the current concept of Technology Education. We have to this point lacked the expertise and funding to accomplish this goal.

If successful in its attempt to obtain this grant, California University will be able to provide our district with consultants, who will work with our faculty in developing courses, course syllabii, and planning the physical organization of cluster laboratories.

Although our district is not located in Washington County, we welcome the opportunity to participate in this new venture.

If I can be of further assistance, please do not hesitate to contact me.

Sincerely yours,

Thomas C. Wilkinson

Thomas C. Wilkinson, Ph. D.
Superintendent of Schools

TCW/pf

Washington School District

Central Office
78 W. Maiden Street
Washington, PA 15301-6994
412-223-5000

R. THOMAS W. HOLTZMAN, JR.
Assistant Superintendent
Curriculum and Instruction

DR. GEORGE E. TAYLOR
Superintendent

JAN CROCKETT MOORE
Business Manager

February 6, 1987

Dean William R. Benedetti
College of Education
California University of Pennsylvania
California, Pennsylvania 15419

Dear Dr. Benedetti:

The Washington School District is interested in supporting your efforts for a proposal to provide funds to accelerate the conversion of Industrial Arts programs to Technology Education curricula.

The Washington School District is currently moving in the direction of revising its Industrial Arts' curriculum to reflect an emphasis on Technology Education.

A project of this sort will be invaluable in assisting our school district during this transition phase.

We appreciate your assistance in this area.

Sincerely,

George E. Taylor

George E. Taylor

cjd

MARY L. GARRIS
BUSINESS MANAGER

JAMES D. HARRISON
S'T COORDINATOR of INSTR

RINGGOLD SCHOOL DISTRICT
1200 CHESS STREET
MONONGAHELA, PENNA. 15063
DR. JAMES A. LOPRESTI, SUPERINTENDENT
ROGER A. D'EMIDIO, SECRETARY
TELEPHONE: (412) 258-9329

DR. CHARLES E. STACEY
ASSISTANT SUPERINTENDENT

G. THOMAS CAUDILL
DIRECTOR of EDUCATIONAL FACILITIES

February 9, 1987

Dr. William R. Benedetti, Dean
College of Education
California University of Pennsylvania
California, PA 15419

Dear Dr. Benedetti:

The Ringgold School District enthusiastically supports the efforts of the College of Education of California University of Pennsylvania in securing a grant to fund Phase II of the Teacher Enhancement program. The consultant funded by the grant could assist the industrial arts faculty of our school district in developing a more meaningful and relevant curriculum. In this age of rapid technological change and development, it is imperative that our students be trained to adapt to the technology of the present as well as for the twenty-first century. The need for technology education is even greater in an area where unemployment is so prevalent and the opportunities for postsecondary education somewhat limited.

The Ringgold School District is willing to assist you in any way possible to secure this grant.

Sincerely,

James A. Lopresti
Superintendent

JAL:bhd

PHONE: 746-1400

Chartiers - Houston School District

OFFICE OF THE SUPERINTENDENT

2080 WEST PIKE STREET
HOUSTON, PENNSYLVANIA 15342

DOROTHY DILLEMUTH
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BUSINESS MANAGER

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IRENE H. SIMS, TREASURER
ANTHONY DIXON
ALEXANDER GUMP
RICHARD HALL
JENNIFER JILLSON
SARAH PORCARO

February 9, 1987

Dr. William Benedetti, Dean
College of Education
California University of PA
California, PA 15419

Dear Dean Benedetti:

The possibility of someone to assist our Industrials Arts teacher in developing a Technical Education Curriculum is encouraging. We are in great need of this help. A new technical educational facility is being constructed, but work on the curriculum has not started.

I sincerely hope you are successful in your efforts to secure the funding needed to provide this consultant service. Is there anything I can do to assist in the effort?

Sincerely,

Dorothy Dillemuth

Dorothy Dillemuth
Superintendent

np

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PETERS TOWNSHIP SCHOOL DISTRICT

616 EAST MCMURRAY ROAD
McMURRAY, PENNSYLVANIA 15317
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B. G. LAUDA
SUPERINTENDENT

DENNIS A. URSO
ASSISTANT SUPERINTENDENT

DALE H. CLAPSADDLE
SECRETARY/
BUSINESS MANAGER

February 9, 1987

Mr. William R. Benedetti, Dean
150004 College of Education
California University of PA.
California, PA. 15419

Dear Mr. Benedetti:

The letter requesting support of a proposal to fund Phase II of the Teacher Enhancement concept has been referred to our office. The focus of the proposal seems to be well directed, as we at Peters Township School District are currently faced with the problem of reviewing our Industrial Arts program to make it a more viable part of the school program. The addition of a consultant to support the efforts of local school districts is not only desirable but necessary, given the rapid changes that are occurring in technology.

Please let us know if we can be of any further assistance in the grant application process. Best wishes with this pursuit.

Very truly yours,

Dennis Urso

DU/mjl

CHARLEROI AREA SCHOOL DISTRICT

FECSEN DRIVE
CHARLEROI, PENNSYLVANIA 15022

DONALD A. CELASCHI, ED. D. SUPERINTENDENT OF SCHOOLS
JOSEPHINE M. YOUNGMAN, BOARD SECRETARY

TELEPHONE: 412 - 483-3509

February 17, 1987

Dr. William R. Benedetti, Dean
College of Education
California University of Pennsylvania
California, Pa. 15419

Dear Dr. Benedetti:

We, at the Charleroi Area School District, fully support your efforts to establish a consultant's position relative to writing a Technology Education Curriculum as part of Phase II of the Teacher Enhancement concept. Our district is rewriting our Industrial Arts curriculum/planned course guides in the Chapter 5 format. Through this work, it has become increasingly evident that, if we are to improve the course offerings available to students, teachers will need the support of someone with knowledge of the field's advances to supply them with the technical assistance not available locally. Beyond the writing of the curriculum, the logistics of its implementation are concerns that are likewise in need of the support services you hope to establish.

We wish you every success as you pursue this most worthwhile goal.

Sincerely yours,

CHARLEROI AREA SCHOOL DISTRICT

Donald A. Celaschi

Donald A. Celaschi, Ed.D.
Superintendent of Schools

DAC:dzh

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California Area School District

R.D. #1, MALDEN ROAD
COAL CENTER, PENNSYLVANIA 15423

THEODORE C. CARLSON
SUPERINTENDENT
(412) 785-2383

February 10, 1987

Dr. William R. Benedetti, Dean
College of Education
California University of Pennsylvania
California, Pennsylvania 15419

Dear Dr. Benedetti:

The California Area School District strongly supports the efforts of the College of Education grant proposal to fund Phase II of the Teacher Enhancement concept.

The conversion of the Industrial Arts programs to Technology Education Curricula is long over due. It is impossible to make the conversion properly without the expertise of those in the field knowledgeable in the Technology Area. The assistance of the College of Education can only enhance our program by lending the support personnel.

Just to note, our poor financial situation in the valley creates a barrier for districts to do projects like this on their own.

Your assistance and help to our district would be greatly appreciated.

Yours truly,

Theodore C. Carlson
Superintendent

TCC:djb

BEST COPY AVAILABLE

HIGH SCHOOL OFFICE
946-3328

MIDDLE SCHOOL OFFICE
946-3323

McGuffey
School District

CLAYSVILLE
663-7772

EAST-WEST FINLEY
663-7755

BLAINE BUFFALO
946-3350

JOE WALKER
222-3061

WEST ALEXANDER
484-7561

FRANK N. ZITO
SUPERINTENDENT
P.O. BOX 431
CLAYSVILLE, PENNSYLVANIA 15323
(412) 663-7745

February 13, 1987

Dr. William R. Benedetti
College of Education
California University of
Pennsylvania
California, Pennsylvania 15419

Dear Dr. Benedetti:

McGuffey School District would most assuredly support California University of Pennsylvania, College of Education efforts to secure a grant to fund Phase II of the Teacher Enhancement concept.

Our school district would be very much interested in having a consultant work with our faculty in writing a Technology Education Curriculum.

Sincerely,

Frank N. Zito
Superintendent

FNZ:fjr

Avella Area School District

AVELLA, PENNSYLVANIA 15312

ADMINISTRATIVE OFFICE
(412) 356-2218 (412) 222-7380
JR., SR. HIGH SCHOOL
ELEMENTARY SCHOOL
(412) 356-2218 (412) 222-6460

February 13, 1987

Mr. William R. Benedetti, Dean
College of Education
California University of Pennsylvania
California, PA 15419

Dear Bill:

I support your effort to obtain a grant to fund Phase II of the Teacher Enhancement concept.

In March we will begin to study a possible renovation of the existing high school facility. I feel that it will be very beneficial to the Avella Area School District to be able to have the ability to call on a consultant to assist in the design of a technology based curriculum and facilities for Industrial Arts.

Gest of luck in your efforts.

Respectfully yours,

AVELLA AREA SCHOOL DISTRICT

William J. Grega
Superintendent

WJG:jf

Dear Fellow Educator:

Project TECH at California University of Pennsylvania is conducting a survey to determine to what extent industrial arts/technology education programs in southwestern Pennsylvania are changing from traditional industrial arts to technology education. Project TECH is a federally funded program providing interested school districts and technology teachers with program resources; such as, teacher inservice training, curriculum instructional materials, consultants and technical assistance.

We need your help! Please take about fifteen minutes of your time to complete the survey and return it in the enclosed envelope. We are interested in the opinions of administrators. Your cooperation will help us in assisting school districts in developing a technology education program to meet the needs of students for the twenty-first century.

For your convenience, we have included technology education definitions.

Your answers will be treated confidentially and no response will ever be identified with your name. The number on the front of the questionnaire will be used only to allow us to identify questionnaires which have been returned.

If you wish a copy of the results, write "COPY OF RESULTS" on the back of the return envelope along with your name and address. Do not write your name on the questionnaire.

If you have further questions, please write or call me. Thank you for yor help.

Sincerely,

Larry R. Collins
Graduate Assistant

Definitions of Technology Education

Technology Education- is an integral part of the general education of each student. It applies math/science/technology through problem solving activities and focuses on a systems approach to develop technological literacy. The systems of communication, construction, manufacturing and transportation provide four broad content areas of study. This comprehensive activity based program is concerned with understanding the evolution, application and significance of technology on society.

Communication Technology- involves the efficient use of resources to create, store and transfer information with various media. Students learn to solve problems related to the impact of communication systems on people and the environment.

Transportation Technology- includes the efficient use of resources to generate, collect, transmit, apply and conserve energy and to physically move materials, goods and people. The impact of transportation technology provides the basis for activities in this content area.

Manufacturing Technology- efficiently employs resources to convert raw material into useful products. Students organize to design, plan and produce products. The impact of technology on industry and society is stressed.

Construction Technology- utilizes resources to efficiently build structures on-site. Students participate in activities building scale models of structures. Students analyze the impacts of technology on people and the environment.

QUESTIONNAIRE

I. General School District Information-

1.1 Please indicate your title

- ☐ Superintendent
- ☐ Assistant Superintendent
- ☐ Curriculum Coordinator
- ☐ Department Head/Supervisor
- ☐ Other _____

1.2 Check the <u>one</u> item that <u>best</u> describes your responsibility concerning curriculum:

- ☐ Recommend curriculum
- ☐ Develop curriculum
- ☐ Implement curriculum
- ☐ Other (specify) _____

1.3 Indicate the <u>number</u> of schools in your district in each of the following categories as applicable:

- ☐ Elementary
- ☐ Middle school/junior high school
- ☐ Combined junior/senior high school
- ☐ Senior high school

1.4 Indicate the number of full time industrial arts/technology teachers according to the school district structure:

- ☐ Elementary
- ☐ Middle school/junior high school
- ☐ Combined junior/senior high school
- ☐ Senior high school

1.5 Please select the range which indicates the <u>approximate</u> number of students enrolled in your school district.

- ☐ 0-2500
- ☐ 2501-5000
- ☐ 5001-10,000
- ☐ 10,001-15,000
- ☐ 15,001-25,000
- ☐ 25,001 & larger

II. Please respond to the following questions concerning the status of your industrial arts/technology education program.

2.1 Check the response which best describes the present industrial arts/technology course titles, such as:

- ☐ Traditional industrial arts (wood, drawing, metals)
- ☐ Pennsylvania Plan (visual communication, power technology, industrial materials)
- ☐ In transition toward technology education (communication, transportation, construction, manufacturing)
- ☐ Technology education in place (communication, transportation, construction, manufacturing)

2.2 Please check the following subjects being offered within the two categories listed:

(please check applicable boxes)

	middle/junior school	high school
Wood		
Metal		
Drafting		
Graphic Arts		
Small Engines		
Electronics		
Power/Energy		
Other_____		
Other_____		
Other_____		

2.3 Are your industrial arts/technology teachers participating in any of the following activities related to technology education?

- ☐ Teacher enhancement programs (cooperation among school districts to upgrade teachers' skills in selected areas)
- ☐ In-service workshops on technology education
- ☐ State or national conferences in industrial arts/technology education
- ☐ Technology education college classes

2.4 Is your school district using any technology education curriculum materials, such as:

- ☐ Curriculum guides
- ☐ Textbooks
- ☐ Audio/visual materials
- ☐ Computer software
- ☐ Other_____

2.5 Have any industrial arts/technology teachers in your school district expressed an interest in changing their curriculum/courses to reflect technology including areas, such as:

(please check applicable boxes)

	middle/junior school	high school
Communication Systems		
Construction Systems		
Manufacturing Systems		
Transportation Systems		
Satellite Communication		
Computer-Aided Drafting		
Robotics		
Fiber Optics		
Numerical Control		
Other_____		
Other_____		

2.6 Are any of the following technology education subjects/units already offered in your school district?

(please check applicable boxes)

	middle/junior school	high school
Communication Systems		
Construction Systems		
Manufacturing Systems		
Transportation Systems		
Satellite Communication		
Computer-Aided Drafting		
Robotics		
Fiber Optics		
Numerical Control		
Other_____		
Other_____		

2.7 Indicate the computer applications currently utilized within your industrial arts/technology education labs?

(please check applicable boxes)

- ☐ None
- ☐ Word processing
- ☐ Desktop publishing
- ☐ Computer aided instruction (CAI)
- ☐ Computer aided drafting (CAD)
- ☐ Computer numerical control (CNC)
- ☐ Computer simulation programs
- ☐ Robotics
- ☐ Other _____
- ☐ Other _____

III. Please indicate your level of awareness for the following:

(Please circle your response)
level of awareness

	high	medium	low	unaware
The existing Pennsylvania Guidelines For Industrial Arts	H	M	L	U
The proposed Pennsylvania Guidelines For Technology Education	H	M	L	U
The International Technology Education Association's Standards For Technology Education	H	M	L	U
Teacher enhancement programs	H	M	L	U
Project TECH	H	M	L	U

IV. Please respond concerning your school district's plans to change your industrial arts/technology education program.

4.2 To what degree is the district planning to change from industrial arts to technology education?

(Please circle your response)
degree of change planned

High Medium Low Unsure None

4.3 Are you planning to offer instruction in any of the following areas ?

	yes	no
Communication Systems	☐	☐
Construction Systems	☐	☐
Manufacturing Systems	☐	☐
Transportation Systems	☐	☐
Satellite Communication	☐	☐
Computer-Aided Drafting	☐	☐
Robotics	☐	☐
Numerical Control	☐	☐
Other	☐	☐

4.4 If you are planning changes, when will the change process begin?

(Please check one box)
☐ 1987-1988 school year
☐ 1988-1989 school year
☐ 1989-1990 school year
☐ beyond 1990 school year

V. Please respond to the following questions concerning how the change will occur.

5.1 In your opinion, what is the level of expertise within your district to accomplish the change to technology education?

(Please circle your response)
level of expertise

very high | high | medium | low | very low

5.2 How important would each of the following be in revising your industrial arts/technology program?

(Please circle your response)
level of importance

	high	medium	low	unsure	none
Teacher enhancement programs	H	M	L	U	N
On site teacher in-service	H	M	L	U	N
Curriculum guides	H	M	L	U	N
Technical assistance with facilities and/or equipment	H	M	L	U	N
Curriculum consultants	H	M	L	U	N
Examples of proven technology education learning activities	H	M	L	U	N
Instructor's guides	H	M	L	U	N
Facility and/or equipment specification consultants	H	M	L	U	N

5.3 To what degree would the following people be involved as change agents for a change to technology education?

(Please circle your response)
degree of involvement

	high	medium	low	unsure	none
District's curriculum coordinator	H	M	L	U	N
Outside curriculum consultants	H	M	L	U	N

VI. Please respond to the following questions concerning your district's commitment to changing the industrial arts/technology education program.

6.1 In your opinion, to what level would your school district commit to purchasing the following equipment:

(Please circle your response)
level of commitment

	high	medium	low	unsure	none
Computer hardware	H	M	L	U	N
Computer software	H	M	L	U	N
Robotics	H	M	L	U	N
Numerical Control	H	M	L	U	N
Computer-Aided Drafting equipment	H	M	L	U	N

6.2 What would be your school district's level of interest in obtaining curriculum materials and instructional resources at reproduction cost?

(Please circle your response)
level of interest

high medium low unsure none

6.3 What is your district's level of interest in a contract to provide on-site curriculum consultants to assist in all phases of curriculum development and implementation?

(Please circle your response)
level of interest

high medium low unsure none

PROJECT TECH*

***Technology Education Curriculum Help**

Dr. Joseph Pecosh, Director
Department of Industry and Technology
California University of Pennsylvania
California, PA 15419
(412) 938-4312

April 1, 1988

Dear Fellow Educator:

Approximately four weeks ago you should have received a questionnaire from Project TECH at California University of Pennsylvania. The response to this project has been most encouraging. The majority of the participating school districts have already responded. Unfortunately, however, your data has not yet been received. Your reply is valuable to this project in that it will help us determine future needs of school districts in Pennsylvania.

For your convenience another copy of the questionnaire is provided. **Please** take a few minutes of your time to complete the questionnaire and return it in the enclosed envelope by April 11, 1988.

Thank you for your cooperation in this matter.

Sincerely,

Larry R. Collins
Graduate Assistant

Summary of the Study

The purpose of this study was to determine the status of technology education within school districts in Southwestern Pennsylvania. More specifically this study examined the Curriculum Coordinators' opinions concerning:

1. The Curriculum Coordinators' opinions of the **extent to which** existing industrial arts/technology education programs meet the proposed Pennsylvania guidelines for technology education?
2. The Curriculum Coordinators' **level of awareness** of the technology education movement?
3. The Curriculum Coordinators' opinions of the **degree of change planned** to existing industrial arts/ technology education programs?
4. The **degree of emphasis** the Curriculum Coordinators' place on outside assistance in implementing changes to industrial arts/technology education programs?
5. The school districts' **level of commitment** in changing existing industrial arts/technology education programs as reported by the Curriculum Coordinators'?

This study was based on the data obtained from the 70 questionnaires completed and returned by the school district's curriculum coordinators (superintendent or his/her designee responsible for curriculum). The study represented industrial arts/technology education programs within

Southwestern Pennsylvania, specifically school districts located in Intermediate Units 1, 2, 3, 7 and 27.

Summary

General Background Information

The title of the individuals who completed the survey varied; however, all participants are involved in administration and/or have responsibilities concerning curriculum. Forty percent of the questionnaires were completed and returned by the school district's Superintendent or Assistant Superintendent. Almost 30 percent of the respondents listed their title as Curriculum Coordinator. Department Heads accounted for just over 20 percent of the returned instruments. The remaining data came from either Principals or Assistant Principals. Eighty percent of the instruments were returned by individuals who listed their curriculum responsibility as either recommendation or development. Less than 20 percent of the data came from individuals who indicated their curriculum responsibility as implementation. The data indicated that there were 222 elementary schools, 55 middle/junior high schools, 25 combined junior/senior high schools and 46 senior high schools within the school districts who responded from Intermediate Units 1, 2, 3, 7 and 27 in Southwestern Pennsylvania.

Data concerning the number of full-time industrial arts/technology education teachers by school category

indicated no full time IA/TE teachers at the elementary school level, 91 at the middle/junior high level, 64 at the combined junior/senior high and 135 at the senior high level.

Over one-half of the respondents indicated that their school district's population was 2500 or less. Less than 40 percent of the data came from districts with a student population of 2501-5000 and the remaining four percent consisted of school districts ranging from 5001-10,000 students.

Extent to Which Existing Industrial Arts/ Technology Education Programs Meet the Proposed Pennsylvania guidelines for Technology Education

Just under one-half of the respondents described their present industrial arts/technology education program as traditional industrial arts. One-fourth of the respondents indicated the Pennsylvania plan describes their program and another one-fourth of the respondents described their program as being in transition toward technology education.

The middle/junior school course offering data revealed that 90 percent of the districts offer woodworking, nearly three-fourths offer metalworking and 60 percent offer drafting. Graphics is offered at 30 percent of the school districts who responded. All other subjects are offered in only 10 percent or less of the districts.

The senior high course offering data revealed nearly the same information as the middle/junior high with a few exceptions. Metalworking is offered at 80 percent of the districts at the high school level. Graphics is available in

over 50 percent of the responding districts. Computer aided drafting is currently offered at only 5 percent of the districts but many are planning to offer it in the future.

Teachers participating in technology education activities revealed that approximately 33 percent of the districts responding had IA/TE teachers who participated in teacher enhancement programs. Thirty percent reported they have IA/TE teachers who have participated in technology education inservice activities and approximately the same number indicated their IA/TE teachers attend state or national IA/TE conferences. Less than 20 percent of the respondents indicated they have teachers who are attending technology education college classes.

Either technology education curriculum guides or textbooks are being utilized by approximately 90 percent of the responding school districts. Nearly 50 percent of the responding population is utilizing computer software and approximately 33 percent use technology education audio-visual materials.

Concerning teacher interest in technology education at the middle/junior high level, 70 percent of the coordinators failed to complete this question. Communications and manufacturing were the most frequently indicated areas of interest by middle/junior high teachers. Nearly 13 percent of the school districts indicated they had teachers who are interested in teaching computer aided drafting.

At the high school level, 30 percent of the coordinators failed to answer this question. Computer aided drafting was indicated as an area of interest by almost 70 percent of the of the coordinators. Approximately 13 percent of the respondents at the high school level selected construction, manufacturing, numerical control, or transportation. Over 35 percent of the districts have teachers with an interest in teaching robotics.

Current technology education course offerings at the middle/junior high level are few and far between. The most frequently selected course was communications which is only offered at 10 percent of the districts. Nearly one-half of the respondents failed to complete this question.

Technology education offerings at the senior high level indicated that computer aided drafting is available in nearly one-half of the districts. Robotics is the next most frequently selected and is offered in approximately 15 percent of the districts. Nearly one-half of the respondents failed to answer this question.

Concerning computer applications within technology education laboratories, computer aided drafting was indicated on 53 percent of the data. Word processing is utilized in over 27 percent of the districts and 20 percent utilize computer aided instruction. Desktop publishing is used in 17 percent of the districts and 11 percent are involved in either computer simulation or robotics.

Level of Awareness of the Technology Education Movement

The awareness of the Pennsylvania Guidelines for Industrial Arts indicated that approximately 70 percent of the school districts had a medium to high level of awareness. Only 10 percent of the districts indicated a high awareness of the proposed Pennsylvania Guidelines for Technology Education and 70 percent of the districts showed either a low or medium awareness. The awareness of the International Technology Education Association's Standards for Implementing Technology Education indicated almost 46 percent of the coordinators were unaware of them. Only 15 percent marked a medium level of awareness. Over 37 percent of the coordinators checked a low level for this item. Almost 43 percent of the coordinators checked either a high or medium level of awareness of teacher enhancement programs. Forty percent indicated a low level of awareness on this question and only 16 percent indicated they were unaware of teacher enhancement programs.

Concerning Project TECH, the data revealed that nearly one-half of the school districts were unaware of it. Thirty-six percent of the respondents indicated a low level of awareness of Project TECH. Approximately 14 percent of the coordinators indicated their awareness of Project TECH as either medium or high.

Degree of Change Planned to Existing Industrial Arts/Technology Education Programs

Nearly 16 percent of the coordinators who responded indicated a high level of change planned to their IA/TE programs. Approximately one-third checked a medium level of change planned and 21 percent of the respondents were unsure of their district's plans to change the IA/TE programs. Ten percent of the coordinators indicated their district would not change their program at this time.

At present, school districts planning to offer instruction in technology education subjects indicated that 61 percent of the districts have decided to offer computer aided drafting. Roughly 20 percent of the districts plan to offer communications, construction or manufacturing. Over 27 percent of the coordinators indicated their district plans to offer robotics. Thirteen percent of the districts are planning to offer numerical control. Nearly one-third of the respondents failed to answer this question.

The change process from industrial arts to technology education will begin during the 1988-89 school year in 34 percent of of the responding districts. Slightly more than 11 percent of the districts began to change their program during the current 1987-88 school year. Nearly 30 percent of the districts will begin to change either in 1989-90 or beyond 1990. Less than 25 percent of the districts left this question unanswered.

Degree of Emphasis Placed on Outside Assistance in Implementing Changes to Industrial Arts/ Technology Education Programs

Concerning the school district's level of expertise in accomplishing the change to technology education, the data indicated that only 23 percent of the school districts had a high level of expertise within their district. A little more than 37 percent checked a medium level while only three percent indicated a high level of expertise within their district. More than 33 percent of the coordinators marked either low or very low expertise within their district.

Over 70 percent of the school districts indicated either a medium or high level of importance for the following in revising their IA/TE programs: on-site inservice programs, curriculum guides and consultants, teacher assistance with facilities and/or equipment, TLA'S (technology learning activities), instructor guides and facility and/or equipment specification consultants.

Nearly 75 percent of the respondents listed the degree of involvement for their district's curriculum coordinator as a change agent in changing to technology education as either medium or high. Over 22 percent of the coordinators checked a high level of involvement for an outside curriculum consultant and 36 percent listed outside curriculum consultant involvement at medium. Only five percent of the respondents listed no involvement for an outside curriculum consultant.

Level of Commitment in Changing Existing Industrial Arts/Technology Education Programs

More than 70 percent of the school districts revealed either a medium or high level of commitment in purchasing computer hardware, computer software and computer aided drafting equipment. Just under one-half of the respondents checked either low or medium concerning their district's commitment to purchasing robotics equipment and 54 percent marked either low or unsure in purchasing computer numerical control equipment.

Level of interest in obtaining curriculum materials and instructional resources at reproduction cost showed that 88 percent of the population marked either medium or high as their level interest in obtaining materials. Six percent indicated they were unsure at the time.

The level of interest in contracting outside curriculum consultants revealed that 30 percent of the coordinators checked a high level of interest in this service. One-fourth of the coordinators checked a medium level of interest and approximately 40 percent checked either low or unsure. Only five percent selected no level of interest in this service.

Conclusions

The conclusions which have been drawn from this study are as follows:

1. Based on course offerings, the level of awareness of the curriculum coordinators concerning the Pennsylvania Guidelines for Technology Education, and the respondents' description of their IA/TE programs, the majority of IA/TE programs in this study do not meet the Pennsylvania Guide-lines for Technology Education. Almost one-half describe their program as traditional industrial arts and more than three-fourths offer woodworking, metalworking, and drafting. One-fourth or less of the districts offer technology education courses such as communications, transportation, manufacturing or construction. Computer aided drafting is the most frequently offered technology education content area and is available in one-half of the high schools.
2. The level of awareness of Curriculum Coordinators in Southwestern Pennsylvania, concerning the technology education movement, is demonstrated by their lack of awareness of either the proposed Pennsylvania Guidelines for Technology Education or The International Technology Education Association's Standards for Implementing Technology Education. Over one-half reported either low or unaware of the Pennsylvania guidelines and over three-fourths answered likewise to the ITEA standards.

3. The degree of change planned to existing IA/TE programs was encouraging. The curriculum coordinators in nearly one-half of the districts checked either a high or medium degree of change planned to existing IA/TE programs. Only one-tenth of the coordinators marked no changes planned. Approximately one-fifth of the coordinators indicated each of the following areas of instruction are planned: communications, construction, and manufacturing. Almost one-fifth of them plan to offer transportation and more than one-half of them plan to offer computer aided drafting.
4. Approximately one-third of the districts will begin to change to technology education during the 1988-89 school year. Less than one fifth will begin changing during the 1989-90 year and approximately the same number indicated their change process will begin after 1990.
5. Outside assistance will be important to the districts during the transition to technology education. Less than one-fourth of them listed their district's expertise to accomplish the change as high or very high and almost two-thirds marked either medium or low.
6. The degree of emphasis placed upon various types of assistance is demonstrated by the fact that each of the following services or items was indicated as having either a high or medium level of importance by more than three-fourths coordinators: Teacher enhancement programs, On-site inservice, Curriculum guides,

Facility/equipment assistance, Curriculum consultants, TLA's (technology learning activities, and Instructor guides.

7. Nearly one-third of the districts indicated a high level of interest in a contractural agreement to provide curriculum consultants to assist in all aspects of program development. Nearly one-fourth indicated a medium level of interest in this service.
8. The curriculum coordinators indicated either a high or medium level of commitment to purchase the following equipment to revise their existing IA/TE programs: computer hardware, computer software, computer aided drafting equipment, robotics equipment, and numerical control equipment.
9. The title most representative of the IA/TE Education program in almost one-half of the school districts who responded is traditional industrial arts. One-fourth of the districts offer the Pennsylvania Plan and another one-fourth are in transition toward technology education.
10. This study paralleled the findings of the Schmitt-Pelley study (1966), concerning the frequency of course offerings at both the high school and at the middle/junior high school levels. The areas of woodworking, metalworking, drafting were the major course offerings.

11. Nearly one-third of the school districts in Southwestern Pennsylvania have teachers who are or have participated in technology education activities such as: inservice workshops, state/national conferences, or teacher enhancement programs.
12. Curriculum guides and computer software are being used in almost one-half of the school districts surveyed.
13. Over one-half of the districts indicated computer aided drafting as an application of computers in their present industrial arts/technology education laboratories.
14. Teacher interest in teaching technology courses at either the senior high level or the middle/junior high level was not high. The most frequently suggested courses at either level were mentioned by less than one-fourth of the teachers as reported by the coordinators.
15. More than three-fourths of the curriculum coordinators checked either low or unaware for their level of awareness of Project TECH.

Recommendations

Based on the findings and the conclusions of this study the following recommendations were made for technology education programs in Southwestern Pennsylvania:

1. The Pennsylvania Department of Education, the Technology Education Association of Pennsylvania and teacher education institutions such as California University of Pennsylvania should develop public relations programs to better inform school administrators and teachers of the need to bring Pennsylvania's IA/TE programs in line with other areas of the country which have already implemented technology education.
2. Project TECH personnel should initiate communication channels with administrators and IA/TE teachers throughout the Commonwealth to educate them on the services available to their school districts.
3. School districts which have already implemented courses such as C.A.D. should be encouraged and assisted to implement other technology courses such as communications, transportation, etc.
4. Public relations efforts should showcase IA/TE programs in the state which have exemplary technology education programs in place or have plans under way.
5. School district administrators and IA/TE teachers should be encouraged to attend state and national industrial arts/technology education conferences to gain insight of the need to revise their existing programs.

APPENDIX

B

ATTACHMENT #3

-SAMPLE THIRD PARTY CONTRACT-

California University of Pennsylvania
California, PA

Project Open Agreement

with
West Virginia University
Morgantown, WV

July 1, 1987

The following agreement is between California University of Pennsylvania, hereinafter referred to as "host"; West Virginia Board of Regents, acting for West Virginia University, hereinafter referred to as the "Vendor"; and a Pennsylvania Public School System (to be named later), hereinafter referred to as "school." The Vendor agrees to provide the school with the following services for the period of September 1, 1987 through June 30, 1988.

I. PURPOSE OF AGREEMENT:

This Project Open agreement is designed to provide the public school system with:

A. Support services to implement the Industry and Technology curriculum in selected schools, and
B. Professional development opportunities for Technology Education teachers involved in the project, and
C. A one- and five-year facility development plan with projected time tables and equipment costs

II. DESCRIPTION OF THE PROJECT

The project will be planned and implemented on a cooperative basis in order to correlate with the school system's comprehensive plan. The vendor will provide the school with consultant services for Technology Education curriculum utilization and appropriate staff development. The Curriculum Consultant will be engaged in graduate studies in Technology Education at WVU while providing an average of twenty (20) hours per week to this project. Dr. David F. McCrory, Professor of Technology Education at WVU and Dr. Joseph Pecosh, Professor of Technology Education at CUP will serve as co-directors of this project and the school superintendent (or his/her designee) will provide administrative input and direction.

III. RESPONSIBILITIES OF THE CURRICULUM CONSULTANT

A. Plan and conduct a program to implement the Industry and Technology curriculum in selected schools.
B. Provide technical update sessions for teachers in the project on new high-tech equipment or processes.
C. Develop and demonstrate model teaching units and learning activities designed to support the school's technology education curriculum.
D. Provide ancillary services as required for success of the project.
E. Work with the host to secure resources to support the project.
F. Provide weekly progress reports to the host and a comprehensive report to the

host and school at the end of the project year.

IV. RESPONSIBILITIES OF THE VENDOR

A. Jointly with the host, recruit, screen and employ a qualified curriculum consultant to serve on this project.
B. Provide the Curriculum Consultant with office and meeting space, clerical suport, and a tuition-free graduate assistantship in Technology Education at WVU.
C. Provide project personnel with research and development support services of the Technology Education Field Service Center and the Technology Education Research Center.
D. Submit periodic and annual reports to the host and school.

V. RESPONSIBILITIES OF THE SCHOOL

A. Provide instructional materials, supplies, equipment, and other support services consistant with the aims and goals of the project.
B. Secure and maintain cooperation of all school personnel directly related to the project.
C. Reimburse the host for project costs in accordance with this agreement.

VI. RESPONSIBILITIES OF THE HOST

A. Provide overall supervision and coordination for the project.
B. Coordinate distribution of curricular support materials.
C. Provide high-technology laboratory update training as needed by project teachers.
D. Provide support to curriculum specialist as needed.
E. Complie, organize and write the final report for this project.
F. Manage all financial expenditures and keep records for the project.
G. Write all grant proposals necessary to provide success for the project.

VII. TIME SCHEDULE

This project is designed for a ten (10) month time period beginning September 1, 1987 and terminating June 30, 1988. Continuous years will be funded for twelve (12) months in length if approved.

VIII. TERMINATION OF THE AGREEMENT

California University of Pennsylvania, West Virginia University and the (to be selected) public school system may terminate the agreement by mutual consent:

A. If approval from the Pennsylvania Department of Vocational Technical Education is obtained;
B. Prior to initiation of the contract if project personnel are not secured by September 1, 1987; or
C. Prior to completion of a full contract if all three parties agree on a negotiated settlement.

IX. PAYMENT SCHEDULE

49

The participating school will pay California University of Pennsylvania for

its share of the services on September 1, 1987. ($5,000 per school)

It is understood that the vendor will receive reimbursement for actual expenditures for any or all of the items outlined below upon proper submittance of invoices to the host, and final reimbursement will be dependent upon receipt of funds from the Commonwealth of Pennsylvania and the selected school district to the host. The host will pay the vendor for subcontracted services, if these stipulations are met according to the following schedule.

First Payment - December 31, 1987 - 50%
Second Payment - March 31, 1988 - 50%

The WVU Comptroller's Office will bill the host on or before the payment dates indicated above.

BUDGET SUMMARY (for each school served)

Personnel	
Curriculum consultant (50% of time x 10 months)	$ 7,000
Support Services	
Including travel, research, development of instructional materials, staff training and project management	$ 5,900
Indirect Costs (Off-campus sponsored programs)	$ 1,100
	$14,000

Technology Education Program

College of Human Resources and Education
609 Allen Hall
P.O. Box 6122
Morgantown, WV 26506-6122

PROJECT OPEN

West Virginia University

Project Open is a curriculum change model designed to provide schools with new, technology-based curricula and instructors trained to implement them. These programs are conducted by the WVU Technology Education Program in cooperation with host institutions. Since its beginning in 1972, Project Open has helped 15 educational institutions to design new curricula, modernize facilities, and upgrade teachers in industrial arts and technology education.

TWO OPTIONS

Project Open has two options: The Teaching Model and the Consultant Model. Each model is designed to address distinctly different situations. The Teaching Model provides teachers and curricula, thus it accomplishes change more quickly. The Consultant Model includes professional development of existing instructors, and requires more time to accomplish program change.

The Teaching Model of Project Open is used where an instructor vacancy exists. The vacancy may result from teacher turnover or from the creation of a new position. For each teaching position, two teacher/scholars are jointly selected by WVU and the host institution. The two persons function as a project team to develop and pilot a new instructional program.

Beginning in the summer, both team members work on campus with faculty and staff of the WVU Technology Education Program to research and develop a preliminary curriculum. The new curriculum is based upon the study of technology and is custom-designed to fit the needs of students in the host institution. During the Fall Semester, one team member assumes the duties of instructor while the other remains on campus to continue development of the curriculum and supporting instructional materials.

At the end of the first year of the project, personnel from the host institution meet with WVU Technology Education faculty to evaluate progress and make recommendations for succeeding years. Ordinarily three years are needed to develop a well-researched and field-tested instructional program.

During the final year of the Teaching Model, a qualified applicant is selected to transition into the new program as a permanent instructor. The teacher may also choose to be enrolled in the off-campus graduate program in Technology Education. Experience has shown that this built-in continuing education component helps to sustain the quality of the program over time.

The Consultant Model of project Open fits situations where instructional programs and instructors are already in place. The purpose of the model is to update the curriculum and facilities and to provide continuing inservice training for teachers. The instructors involved in the project may choose to enroll in the graduate degree program in Technology Education at WVU. The development of a well-researched technology-based instructional program in the host institution can become the Master's Degree Project for the instructor(s), thus reinforcing program change.

An advanced graduate student is jointly selected by the host institution and WVU to function as a unique kind of curriculum consultant on this type of Project Open. The consultant is selected on the basis of his or her prior experience and competencies in teaching and program development.

As each new Consultant Model project begins, the consultant meets with the teachers to be involved, school officials, and WVU faculty representatives to develop a plan of action. Once a plan is established, the consultant works on a regular basis to assist the teachers in program development. The assistance may include model teaching, special inservice training, instructional materials development, or a number of other activities specially designed to fit the situation.

At the end of the project, curriculum materials are presented to the host institution. The materials describe the philosophy and rationale of the new program and includes a detailed description of instructional content and suggested learning activities. The document serves to guide future development of the new program and, in the event of teacher turnover, helps insure that new personnel will continue to follow the curriculum direction approved by the institution.

COSTS

Project Open curriculum change models are conducted on a self-supporting basis, although outside funding is often one outcome of the projects. Each cooperating institution enters into a service contract with the university. The roles and responsibilities of project personnel are clearly spelled out in the agreement, and a budget of project development and management expenses is included. Each Project Open agreement is developed to fit the specific situation. The actual costs to the host institution depend upon the type of change model used and the nature of expected outcomes.

FOR MORE INFORMATION

Educational institutions seeking more information about the Project Open curriculum change strategy should contact the Technology Education Field Service Center at the address on the front of this document, or call Dr. David McCrory (304) 293-3803.

WVU-TE
3/20/86

COMMONWEALTH OF PENNSYLVANIA

STATE SYSTEM OF HIGHER EDUCATION

CONTRACT FOR

California University of Pennsylvania

THIS CONTRACT is made and entered into this fifth day of August, 1986, at Washington County, Pennsylvania, by and between California University of Pennsylvania of the State System of Higher Education, Commonwealth of Pennsylvania, hereinafter referred the "host"

AND

West Virginia Board of Regents, acting for West Virginia University, hereinafter referred the "vendor".

AND

Chartiers-Houston School District hereinafter referred to as "school".

The host, for and in consideration of the terms of this contract, agrees to provide services described in Rider A. This contract is not valid or enforceable until approved by University Legal Counsel and the Office of the Attorney General.

The following Riders are hereby incorporated into and made a part of this contract:

Rider A (Specifications of Services to be Provided) consisting of 3 pages

Rider B (Terms and Conditions) consisting of 2 pages

Rider C (Non-Discrimination Clause) consisting of 2 pages

FOR WEST VIRGINIA UNIVERSITY:

_____
President

_____
University Legal Counsel

AND

FOR CHARTIERS-HOUSTON SCHOOL DISTRICT

_____
President, Board of Directors

_____
Legal Counsel

FOR THE COMMONWEALTH:

_____
Vice President for Administration and Finance
California University of Pennsylvania
State System of Higher Education

Approved as to Form and Legality:

_____
University Legal Counsel
State System of Higher Education

_____
Deputy Attorney General
Commonwealth of Pennsylvania

Rider A

California University of Pennsylvania
California, PA

Project TECH Agreement
(Technology Education Curriculum Help)

with
West Virginia University
Morgantown, WV

and

Chartiers-Houston School District
Houston, PA

September 1, 1987

The following agreement is between California University of Pennsylvania, hereinafter referred to as "host"; West Virginia Board of Regents, acting for West Virginia University, hereinafter referred to as the "Vendor"; and Chartiers-Houston School District, hereinafter referred to as "school." The Host agrees to provide the school with the following services for the period of September 1, 1987 through June 30, 1988.

I. PURPOSE OF AGREEMENT:

This Project TECH agreement is designed to provide the public school system with:

A. Support services to implement the Industry and Technology curriculum in selected schools, and
B. Professional development opportunities for Technology Education teachers involved in the project and
C. A one- and five-year curriculum/facility development plan with projected time tables and equipment costs

II. DESCRIPTION OF THE PROJECT

The project will be planned and implemented on a cooperative basis in order to correlate with the school system's comprehensive plan. The vendor will provide the school with consultant services for Technology Education curriculum utilization and appropriate staff development. The Curriculum Consultant will be engaged in graduate studies in Technology Education at WVU while providing an average of twenty (20) hours per week to this project. Dr. David F. McCrory, Professor of Technology Education at WVU and Dr. Joseph Pecosh, Professor of Technology Education at CUP will serve as co-directors of this project and the school superintendent (or his/her designee) will provide administrative input and direction.

III. RESPONSIBILITIES OF THE CURRICULUM CONSULTANT

A. Plan and conduct a program to implement the Industry and Technology curriculum in selected schools.
B. Provide technical update sessions for teachers in the project on new high-tech equipment or processes.
C. Develop and demonstrate model teaching units and learning activities designed to support the school's technology education curriculum.
D. Provide ancillary services as required for success of the project.
E. Work with the host to secure resources to support the project.
F. Provide weekly progress reports to the host and a comprehensive report to the host and school at the end of the project year.

IV. RESPONSIBILITIES OF THE VENDOR

A. In consultation with the host, recruit, screen and employ a qualified curriculum consultant to serve on this project.
B. Provide the Curriculum Consultant with office and meeting space, clerical suport, and a tuition-free graduate assistantship in Technology Education at WVU.
C. Provide project personnel with research and development support services of the Technology Education Field Service Center and the Technology Education Research Center.
D. Submit periodic and annual reports to the host and school.

V. RESPONSIBILITIES OF THE SCHOOL

A. Provide instructional materials, supplies, equipment, and other support services consistant with the aims and goals of the project.
B. Secure and maintain cooperation of all school personnel directly related to the project.
C. Reimburse the host for project costs ($5,000) in accordance with this agreement.

VI. RESPONSIBILITIES OF THE HOST

A. Provide overall supervision and coordination for the project.
B. Coordinate distribution of curricular support materials.
C. Provide high-technology laboratory update training as needed by project teachers.
D. Provide support to curriculum specialist as needed.
E. Compile, organize and write the final report for this project.
F. Manage all financial expenditures and keep records for the project.
G. Write all grant proposals necessary to provide success for the project.

VII. TIME SCHEDULE

This project is designed for a ten (10) month time period beginning September 1, 1987 and terminating June 30, 1988. Continuous years will be funded for twelve (12) months in length if approved.

Rider A

VIII. TERMINATION OF THE AGREEMENT

California University of Pennsylvania, West Virginia University, and Chartiers-Houston School District may terminate the agreement by mutual consent:

A. If approval from the Pennsylvania Department of Vocational Technical Education is obtained;
B. Prior to initiation of the contract if project personnel are not secured by September 1, 1987; or
C. Prior to completion of a full contract if all three parties agree on a negotiated settlement.

IX. PAYMENT SCHEDULE

Chartiers-Houston School District will pay California University of Pennsylvania for its share of the services ($5,000) on September 1, 1987. It is understood that the vendor will receive reimbursement for actual expenditures for any or all of the items outlined below upon proper submittance of invoices to the host, and final reimbursement will be dependent upon receipt of funds from the Commonwealth of Pennsylvania and the selected school district to the host. The host will pay the vendor for subcontracted services, if these stipulations are met according to the following schedule.

First Payment - December 31, 1987 - 50%
Second Payment - March 31, 1988 - 50%

The WVU Comptroller's Office will bill the host on or before the payment dates indicated above.

BUDGET SUMMARY (for each school district served)

Personnel	
Curriculum consultant (50% of time x 10 months)	$ 7,000
Support Services	
Including travel, research, development of instructional materials, staff training and project management	$ 5,900
Indirect Costs (Off-campus sponsored programs)	$ 1,100
	$14,000

3 of 3

Rider B

TERMS AND CONDITIONS FOR NON-CONSTRUCTION CONTRACTS

1. Show contract Title and Number on all invoices and correspondence concerning the payment of invoices to Accounts Payable. Address inquiries concerning the payment of invoices to the Accounts Payable Dept.

2. The Commonwealth is exempt from all excise taxes imposed by the Internal Revenue Service, and has accordingly registered with the Internal Revenue Service to make tax free purchases under Registration No. 23740001-K. No exemption certificates are required and none will be issued.

3. The Commonwealth is exempt from Pennsylvania Sales Tax. The Sales and Use Tax Regulations provide that exemption certificates are not required for sales made to government entities. Exemption certificates will not be issued.

4. Contractor agrees to comply with all applicable laws and regulations of the Commonwealth in carrying out this contract.

5. Contractor, its agents and employees, shall act in a independent capacity and shall not act or be deemed to act as officers, employees, or agents of the Commonwealth.

6. Send itemized invoices in duplicate promptly upon service rendered. Do not include in one invoice items with more than one contract number.

7. Questions concerning this contract should be directed to the Director of Purchasing. Any correspondence concerning invoices or the payment of bills should be directed to the Accounts Payable Department.

8. Regardless of provisions to the contrary found elsewhere in the provisions of this contract, the laws of the Commonwealth of Pennsylvania shall be used in the interpretation of this contract and shall prevail over the laws of any other state in the construction of the contract.

9. In the event of conflict between the provisions of this form and any attachment hereto, the provisions of this form shall prevail.

10. Performance of this contract is not assignable without prior written consent of the Commonwealth.

Rider B

11. The Commonwealth may terminate this contract for its convenience if the Commonwealth determines termination to be in its best interest. Contractor shall be paid for work completed.

12. The Commonwealth's obligations are contingent upon appropriation of funds for the contract purpose.

13. This contract and/or attachments constitutes the entire agreement between the parties.

14. In carrying out this Contract, the Contractor shall minimize pollution and shall strictly comply with all applicable environmental laws and regulations.

Rider C

Non-Discrimination Clause

During the term of this contract, Contractor agrees as follows:

1. Contractor shall not discriminate against any employee, applicant for employment, independent contractor or any other person because of race, color, religious creed, ancestry, national origin, age or sex.

Contractor shall take affirmative action to ensure that applicants are employed, and that employees or agents are treated during employment, without regard to their race, color, religious creed, ancestry, national origin, age or sex. Such affirmative action shall include, but is not limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination, and selection for training.

Contractor shall post in conspicuous places, available to employees, agents, applicants for employment and other persons, a notice to be provided by the contracting agency setting forth the provisions of this non-discrimination clause.

2. Contractor shall send each labor union or workers' representative with which it has a collective bargaining agreement or other contract or understanding, a notice advising said labor union or workers' representative or its commitment to this non-discrimination clause. Similar notice shall be sent to every source of recruitment regularly utilized by Contractor.

3. It shall be no defense to a finding of noncompliance with the Contract Compliance Regulations issued by the Pennsylvania Human Relations Commission or this non-discrimination clause that Contractor had delegated some of its employment practices to any union, training program or other source of recruitment which prevents it from meeting its obligations. However, if the evidence indicates that the Contractor was not on notice of the third-party discrimination or made a good faith effort to correct it, such factor shall be considered in mitigation in determining appropriate sanctions.

Rider C

4. Where the practices of a union or of any training program or other source of recruitment will result in the exclusion of minority group persons, so that Contractor will be unable to meet its obligations under the Contract Compliance Regulations issued by the Pennsylvania Human Relations Commission, or this non-discrimination clause, Contractor shall then employ and fill vacancies through other non-discriminatory employment procedures.

5. Contractor shall comply with the Contract Compliance Regulations of the Pennsylvania Human Relations Commission, 16 Pa. Code Chapter 49 and with all laws prohibiting discrimination in hiring or employment opportunities. In the event of Contractor's noncompliance with the non-discrimination clause of this contract or with any such laws, this contract may, after hearing and adjudication, be terminated or suspended, in whole or in part, and Contractor may be declared temporarily ineligible for further Commonwealth contracts, and such other sanctions may be imposed and remedies invoked as provided by the Contract Compliance Regulations.

6. Contractor shall furnish all necessary employment documents and records to, and permit access to its books, records and accounts by, the contracting agency and the Human Relations Commission, for purposes of investigation to ascertain compliance with the provisions of the Contract Compliance Regulations, pursuant to 49.35 of these Regulations. If Contractor does not possess documents or records reflecting the necessary information requested, it shall furnish such information on reporting forms supplied by the contracting agency or the Commission.

7. Contractor shall actively recruit minority subcontractors or subcontractors with substantial minority representation among their employees.

8. Contractor shall include the provisions of this non-discrimination clause in every subcontract, so that such provisions will be binding upon each subcontractor.

9. The terms used in this non-discrimination clause shall have the same meaning as in the Contract Compliance Regulations issued by the Pennsylvania Human Relations Commission, 16 Pa. Code Ch. 49.

10. Contractor obligations under this clause are limited to the Contractor's facilities within Pennsylvania, or, where the contract is for purchase of goods manufactured outside of Pennsylvania, the facilities at which such goods are actually produced.

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COMMONWEALTH OF PENNSYLVANIA

STATE SYSTEM-OF HIGHER EDUCATION

CONTRACT FOR

California University of Pennsylvania

THIS CONTRACT is made and entered into this fifth day of August, 1987, at Washington County, Pennsylvania, by and between California University of Pennsylvania of the State System of Higher Education, Commonwealth of Pennsylvania, hereinafter referred the "host"

AND

West Virginia Board of Regents, acting for West Virginia University, hereinafter referred the "vendor".

AND

Canon-McMillan School District hereinafter referred to as "school".

The host, for and in consideration of the terms of this contract, agrees to provide services described in Rider A. This contract is not valid or enforceable until approved by University Legal Counsel and the Office of the Attorney General.

The following Riders are hereby incorporated into and made a part of this contract:

Rider A (Specifications of Services to be Provided) consisting of 3 pages

Rider B (Terms and Conditions) consisting of 2 pages

Rider C (Non-Discrimination Clause) consisting of 2 pages

FOR WEST VIRGINIA UNIVERSITY:

_____
President

_____
University Legal Counsel

AND

FOR CANON-McMILLAN SCHOOL DISTRICT

_____
President, Board of Directors

_____
Legal Counsel

FOR THE COMMONWEALTH:

_____
Vice President for Administration and Finance
California University of Pennsylvania
State System of Higher Education

Approved as to Form and Legality:

_____
University Legal Counsel
State System of Higher Education

_____
Deputy Attorney General
Commonwealth of Pennsylvania

Rider A

California University of Pennsylvania
California, PA

Project TECH Agreement
(Technology Education Curriculum Help)

with
West Virginia University
Morgantown, WV

and

Canon-McMillan School District
Canonsburg, PA

September 1, 1987

The following agreement is between California University of Pennsylvania, hereinafter referred to as "host"; West Virginia Board of Regents, acting for West Virginia University, hereinafter referred to as the "Vendor"; and Canon-McMillan School District, hereinafter referred to as "school." The Host agrees to provide the school with the following services for the period of September 1, 1987 through June 30, 1988.

I. PURPOSE OF AGREEMENT:

This Project TECH agreement is designed to provide the public school system with:

A. Support services to implement the Industry and Technology curriculum in selected schools, and
B. Professional development opportunities for Technology Education teachers involved in the project and
C. A one- and five-year curriculum/facility development plan with projected time tables and equipment costs

II. DESCRIPTION OF THE PROJECT

The project will be planned and implemented on a cooperative basis in order to correlate with the school system's comprehensive plan. The vendor will provide the school with consultant services for Technology Education curriculum utilization and appropriate staff development. The Curriculum Consultant will be engaged in graduate studies in Technology Education at WVU while providing an average of twenty (20) hours per week to this project. Dr. David F. McCrory, Professor of Technology Education at WVU and Dr. Joseph Pecosh, Professor of Technology Education at CUP will serve as co-directors of this project and the school superintendent (or his/her designee) will provide administrative input and direction.

III. RESPONSIBILITIES OF THE CURRICULUM CONSULTANT

A. Plan and conduct a program to implement the Industry and Technology curriculum in selected schools.
B. Provide technical update sessions for teachers in the project on new high-tech equipment or processes.
C. Develop and demonstrate model teaching units and learning activities designed to support the school's technology education curriculum.
D. Provide ancillary services as required for success of the project.
E. Work with the host to secure resources to support the project.
F. Provide weekly progress reports to the host and a comprehensive report to the host and school at the end of the project year.

IV. RESPONSIBILITIES OF THE VENDOR

A. In consultation with the host, recruit, screen and employ a qualified curriculum consultant to serve on this project.
B. Provide the Curriculum Consultant with office and meeting space, clerical suport, and a tuition-free graduate assistantship in Technology Education at WVU.
C. Provide project personnel with research and development support services of the Technology Education Field Service Center and the Technology Education Research Center.
D. Submit periodic and annual reports to the host and school.

V. RESPONSIBILITIES OF THE SCHOOL

A. Provide instructional materials, supplies, equipment, and other support services consistant with the aims and goals of the project.
B. Secure and maintain cooperation of all school personnel directly related to the project.
C. Reimburse the host for project costs ($5,000) in accordance with this agreement.

VI. RESPONSIBILITIES OF THE HOST

A. Provide overall supervision and coordination for the project.
B. Coordinate distribution of curricular support materials.
C. Provide high-technology laboratory update training as needed by project teachers.
D. Provide support to curriculum specialist as needed.
E. Compile, organize and write the final report for this project.
F. Manage all financial expenditures and keep records for the project.
G. Write all grant proposals necessary to provide success for the project.

VII. TIME SCHEDULE

This project is designed for a ten (10) month time period beginning September 1, 1987 and terminating June 30, 1988. Continuous years will be funded for twelve (12) months in length if approved.

Rider A

VIII. TERMINATION OF THE AGREEMENT

California University of Pennsylvania, West Virginia University, and Canon-McMillan School District may terminate the agreement by mutual consent:

A. If approval from the Pennsylvania Department of Vocational Technical Education is obtained;
B. Prior to initiation of the contract if project personnel are not secured by September 1, 1987; or
C. Prior to completion of a full contract if all three parties agree on a negotiated settlement.

IX. PAYMENT SCHEDULE

Canon-McMillan School District will pay California University of Pennsylvania for its share of the services ($5,000) on September 1, 1987. It is understood that the vendor will receive reimbursement for actual expenditures for any or all of the items outlined below upon proper submittance of invoices to the host, and final reimbursement will be dependent upon receipt of funds from the Commonwealth of Pennsylvar

APPENDIX

C

EXPLORING TECHNOLOGY

GRADE 7

EXPLORING TECHNOLOGY

COURSE DESCRIPTION:

Introduction to Technological systems will provide students with an overview of othe three systems of technology: Communication, Production, and Transportation/ Power. Students will study important historical developments in each system, apply the system model approach to a group project, and investigate the impacts of technology on people; their careers, society, the environment, and the future.

Students will perform hands-on, problem solving activities related to the safe and efficient completion of the group project.

COURSE GOALS:

At the completion of this course the student will be able to:

1. Demonstrate and understand the use of the elements of communication, production and transportation systems.
2. Apply problem solving and creative processes
3. Understand and appreciate the relationship between the individual, society, and technology.
4. Understand the role of competent and responsible technologically literate people as they carry out their daily functions as informed citizens.

Grade I Course Title: Exploring Technology

	Pub.Co.	Title of Text	Author	C.Date
*1.	Delmar	Living with Technology	M.Hacker/R.Barden	88
2.	Davis	Understanding and Using Tech.	R.Todd/D.McCrory	85
3.	Delmar	Technology in Your World	M.Hacker/R.Barden	87
4.	Davis	Resources in Technology	D.McCrory/G.Maughan	
5.	Davis	Resources in Technology-85	D.McCrory/G.Maughan	
6.	Good/Wil.	Processes of Manufacturing	Thomas Wright	87
7.	Good/Wil.	Exploring Manufacturing	Thomas Wright	85
8.	Good/Wil.	Exploring Construction	Richard Henak	85
9.	Pro.Hand.	Odyssey of the Mind	S.Micklus/C.Micklus	87
10.	Creat.Com.	Problems, Problems, Problems	T.Gourley/S.Micklus	84
11.	Creat.Com.	O-M-AHA!	Samuel Micklus	86
12.	Creat.Com.	Odyssey of the Mind	Samuel Micklus	84
13.	Har.Brace	Discovering Communication Tech.	R.Jones/J.Robb	86
14.	Good/Wil.	Construction-Materials,Methods, Careers	Jack Landers	83
15.	Good/Wil.	Manufacturing-Material Process. Management, Careers	Thomas Wright	84

VIDEOS

1.	World Finals Video Yearbook	1987 Odyssey of the Mind	
2.		Impact of Tech.on Todays Education	James Benson
3.	Karol Media	A Fitting Occupation (Videotape)	

EXPLORING TECHNOLOGY - GRADE 7
9 Week Sessions = 45 Class Periods
1 Class Period = 42 Minutes

STRAND	TIME ALLOCATED Periods	Hours
I The Nature of Technology	2	1.4
II Evolution of Technology	3	2.1
III Impact of Technology	3	2.1
IV Adapting Technology	4	2.8
V Introduction to the Laboratory	1	.7
VI Communication System	10	7.0
VII Transportation System	10	7.0
VIII Construction	7	4.9
IX The Individual and Technology	5	3.5
Total Periods	45	Hours 31.5

Exploring Technology
Outline

1.0 The nature of technology
- 1.1 Definition of technology
- 1.2 Human needs and wants

2.0 Evolution of technology
- 2.1 Development of knowledge, skill and tools
  - 2.1.1 Beginnings of technology
  - 2.1.2 Extending human potential
- 2.2 Technology today
- 2.3 Future of technology

3.0 Elements of technology
- 3.1 People
- 3.2 Information
- 3.3 Processes
- 3.4 Materials
- 3.5 Tools
- 3.6 Energy
- 3.7 Capital
- 3.8 Time

4.0 Impacts of technology
- 4.1 Positive & negative
  - 4.1.1 Individual
  - 4.1.2 Societal
  - 4.1.3 Technological
  - 4.1.4 Environmental

5.0 Introduction to lab
- 5.1 Tour and orientation
- 5.2 Safety
- 5.3 Rules

6.0 Technical Systems
- 6.1 Definition of technical systems
- 6.2 Human adaptive systems
  - 6.2.1 Communication
  - 6.2.2 Transportation
  - 6.2.3 Production

7.0 Communication System
- 7.1 Definition of communication
- 7.2 Communication model
  - 7.2.1 Sender
  - 7.2.2 Channel
  - 7.2.3 Receiver
  - 7.2.4 Message
  - 7.2.5 Feedback
- 7.3 Types of communication
  - 7.3.1 Visual
  - 7.3.2 Audio
  - 7.3.3 Audio Visual

8.0 Transportation System
- 8.1 Definition of transportation
- 8.2 Modes of Transportation
  - 8.2.1 Land (terrestrial)
  - 8.2.2 Water (marine)
  - 8.2.3 Air (atmospheric)
  - 8.2.4 Space
  - 8.2.5 Conduit
- 8.3 People vs. goods

9.0 Production Systems
- 9.1 Definition of production
  - 9.1.1 Processing
  - 9.1.2 Manufacturing
  - 9.1.3 Construction
- 9.2 Processing
  - 9.2.1 Definition of processing
  - 9.2.2 Extract
  - 9.2.3 Refine
- 9.3 Manufacturing
  - 9.3.1 Definition of manufacturing
  - 9.3.2 Manufacturing processes
    - 9.3.2.1 Layout and measurement
    - 9.3.2.6 Assembling
    - 9.3.2.7 Finishing
  - 9.3.3 Manufacturing materials
  - 9.3.4 Using tools
  - 9.3.5 Manufacturing the product
- 9.4 Construction
  - 9.4.1 Definition of construction
  - 9.4.2 Structures
  - 9.4.3 Structural loads
  - 9.4.4 Structural shapes

10.0 The individual and technology
- 10.1 Creativity
- 10.2 Technological literacy
- 10.3 Responsibility

STRAND: 1 NATURE OF TECHNOLOGY COURSE: Exploring Tech-Gr7

VOCABULARY:

Technology
Impact
Negative
Positive
Technological literacy
Science

RESOURCES:

TEXT: Living with Technology by Michael Hacker/Robert Barden
Copyright 1988
Delmar Publishers
Albany, N.Y.

Understanding and Using Technology by Ronald D. Todd, David McCrory
Karen I Todd
Copyright 1985
David Publications Inc.
Worcester, MA

Technology In Your World by Michael Hacker/Robert Barden
Copyright 1987
Delmar Publishers, Inc.
Albany,N.Y.

Strand: I Nature of Technology **Course:** Exploring Tech-Gr7

Time: 2 Days

Concepts	Objectives
1. Definition	1.1 Student will be able to define technology as the use of knowledge, skills, and tools to solve problems, extend human capabilities, and improve the quality of life
2. Human needs and Wants	2.1 Describe the relationship between knowledge, experience, and learning
	2.2 Cite practical examples of how technology improves the quality of life
	2.3 Cite possible examples of how technology could improve their lives in the future
	2.4 Cite examples of how technology satisfies human wants

Strand: I Nature of Technology Course: Exploring Tech-Gr7

Suggested activities	Notes

1. Students will write own definition
2. Discuss what technology means to each one of us
3. Information sheets - What is Technology?
4. List as many ways as you can - How does technology affect you everyday?
5. Discuss negative impacts of technology
6. Discuss man's basic needs and wants
7. Activity sheets: Making a technology Mobile: making technology collage

STRAND: II Evolution of Tech COURSE: Exploring Tech - Gr7

VOCABULARY:

Tool
Stone Age
Iron Age
Agricultural Era
Industrial Revolution
Information Age
Human Potential

RESOURCES:

TEXT: Living with Technology by Michael Hacker/Robert Barden
Copyright 1988
Delmar Publishers
Albany,N.Y.

Understanding and Using Technology by R.Todd/D. McCrory
Copyright 1985
Davis Publishers

Technology in your World by M. Hacker/Robert Barden
Copyright 1987
Delmar Publishers
Albany,N.Y.

Strand: II Evolution of Technology **Course:** Exploring Tech-Gr7

Time: 2 days

Concepts	Objectives
1. Development of Tools	1.1 Cite examples and compare past and present technology
2. Beginnings of Technology	2.1 Describe how technology waas developed through meeting human needs of food, shelter, and clothing
3. Extending Human Potential	3.1 Define and cite examples of the extension of human potential
	3.2 Predict future technology
4. Technology Today	4.1 Define an element of technology
5. Future of Technology	5.1 List the elements of technology: people, information, processes, materials, tools, energy, capital, and time
6. Elements of technology	6.1 Define each element of technology

Strand: II Evolution of Tech Course: Exploring Tech-Gr7

Suggested activities	Notes

1. Discuss Caveman using rock as weapon
2. Tying rock to stick-further development
3. When did technology begin? Discuss-who started it
4. Can animals develop technology?
5. Stone Age, Bronze Age, Iron Age
6. Agricultural Era, Industrial Revolution, Information Age
7. What does it mean - How Do We Do It?
8. Discuss Time Line - Technology development Past and Present - Stone Age through information age of today
9. What is in store? Where will it take us?
10. Information sheets on Elements (2)
11. How do these elements interract with each other?
12. Cite examples
13. Explain each
14. Activity Sheet - Discuss "Tempus EDAX Rerum"

STRAND: III Impact of Technology COURSE: Exploring Tech-Gr7

VOCABULARY:

Routine

RESOURCES:

TEXT: Living with Technology by Michael Hacker/Robert Barden
Copyright 1988
Delmar Publishers
Albany, N.Y.

Strand: III Impact of Technology **Course:** Exploring Tech-Gr 7

Time: 3 days

Concepts	Objectives
1. Positive/Negative	1.1 Define technological impacts as the effect something has on something else
	1.2 Classify the impacts of technology as individual, societal, technical, and environmental
	1.3 Investigate the positive and/or negative impacts of technology
	1.4 Discuss the impacts of technology from both an individual and societal viewpoint

Strand: III Impact of Technology **Course:** Exploring Tech-Gr7

Suggested activities	Notes

1. Discuss Negative impacts of technology
   i.e. Nuclear waste, nuclear bombs, fire-arms, pesticides, automation-loss of jobs, etc...

2. <u>Introduce Activity</u> - Do notebook cover-
   Must contain the word "Technology" with type of illustration, name, grade, year, school, etc.... Allow 1 week for completion

3. Explain purpose and importance of notebook

4. Notebook evaluation

STRAND: IV Adapting Technology COURSE: Exploring Tech-Gr7

VOCABULARY:

Create
Recreate
Innovation
Appropriate
Problem Solving
Brainstorming
Serendipity

RESOURCES:

Living with Technology	by	M. Hacker/Robert Barden Copyright 1988 Delmar Publishers
"Odyssey of the Mind" Videotape	by	Dr. Sam Micklus Copyright 1987 Pro.Handbook
Problems, Problems, Problems	by	T.Gourley/S.Micklus Copyright 1984 Creative Com.
O-M-AHA!	by	Sam Micklus Copyright 1986 Creative Co.
Odyssey of the Mind	by	Sam Micklus Copyright 1984 Creative Com.
Understanding/Using Technology	by	Todd, McCrory, Todd Copyright 1985 Davis

Strand: IV Adapting Technology **Course:** Exploring Tech-Gr7

Time: 4 days

Concepts	Objectives
1. Invention and Innovation	1.1 Justify the need for the adaption of technology
	1.2 Compare and contrast invention and innovation
	1.3 Display creative process through the invention or improvement of existing technology to fulfill a need or problem
	1.4 Explain how problems are solved through research and development
2. Appropriate Technology	2.1 Define appropriate technology
	2.2 Compare the impacts of specific technologies to different cultures
	2.3 Hypothesize how existing technologies must be adapted to different cultures
	2.4 Describe the difference between developed and developing countries
	2.5 Cite examples of developed and developing countries

Strand: IV Adapting Technology Course: Exploring Tech-Gr7

Suggested activities	Notes
1. Show videotape: Odyssey of the Mind By Dr. Sam Micklus Creating competition among students throughout the world. Problem solving techniques	
2. Have you ever created technology	
3. Stress importance of problem solving	
4. How do we create?	
5. What is brainstorming?	
6. What do we mean by serendipity?	
7. Have you ever created technology?	
8. What does it mean to recreate technology?	
9. Appropriate Technology-What does it mean? Discuss: i.e. - Sophisticated agricultural machinery to third world country without education, fuel, or necessary support equipment	

STRAND: V Introduction to Lab COURSE: Exploring Tech-Gr7

VOCABULARY:

RESOURCES:

TEXT: Living with Technology by Michael Hacker/Robert Barden
Copyright 1988
Delmar Publishers
Albany,N.Y.

Strand: V INTRODUCTION TO LAB **Course:** Exploring Tech-Gr7

Time: 1 Day

Concepts	Objectives
1. Tour and Orientation	1.1 Indicate the impacts of tools and materials in the lab on society and the environmental
	1.2 Locate and identify the physical layout of lab procedures
2. Safety	2.1 Follow and exhibit appropriate and safe lab procedures
3. Rules	3.1 Select and demonstrate safe use of tools in the lab

Strand: V Intro to Lab **Course:** Exploring Tech-Gr7

Suggested activities	Notes

1. Have class tour lab. Q&A, explain various areas and physical facilities
2. Discuss and present safety codes and practices - demonstrate procedures
3. Safety is on-going-constantly being taught with each new activity
4. Inform class as to what is expected from them - keep it simple, fair, and enforcable
5. Each student create SAFETY POSTER

STRAND: VI Communication System COURSE: Exploring Tech-Gr7

VOCABULARY:

Communication	Interference
Sender	Receiver
Channel	System
Message	Process
Feedback	Output

RESOURCES:

Living with Technology	by	Michael Hacker/Robert Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Communication Technology	by	Janet L. Robb Copyright 1986 Harcourt Brace
Resources in Technology	by	David L. McCrory, G.R.Maughan Davis Publications, Inc. Worcester, MA

Strand: VI Communication System **Course:** Exploring Tech-Gr 7

Time: 10 days

Concepts	Objectives
1. Definition of Communication	1.1 Participate in various activities involving the different types of communication
	1.2 Explain that understanding the message is the key to all communication
	1.3 Define communication as effectively sending and receiving messages
	1.4 Explain the interrelationship between communication and technology
2. Communication Model	2.1 Draw and label the communication model
3. Types of Communication	3.1 Designate and describe the three types of communication: visual, audio, and audio-visual
	3.2 List and give examples of the three types of communication

Strand: VI Communication System **Course:** Exploring Tech-Gr7

Suggested activities	Notes

1. Class discussion on defining communication
2. Draw on paper of weekend activities
3. Activities - pass around to see if someone can interpret what you did
4. Play win, lose, or draw - use terms from Technology - Divide class into 4 groups
5. Information sheet with five elements necessary for communication process explain each
6. Who communicates
7. How do we communicate
8. Discuss a wink, smile, frown, touch, body language, facial expression, fragrance, sense of smell, hearing, sight, etc...

MAJOR ACTIVITY - Divide class into 4 groups, produce a video Activity Packet - Video Production

STRAND: VII Transportation System COURSE: Exploring Tech-Gr7

VOCABULARY:

Transport
Mode
Vehicle
Energy
Guideway
Degrees of Freedom
Stationary
Thrust

RESOURCES:

Living with Technology	by	Michael Hacker Robert Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Understanding and Using Technology	by	Todd, McCrory, Todd Copyright 1985 David Publications, Inc.
The Technology Teacher	by	Dr. Stan Komacek
Resources in Technology	by	David McCrory,George Maughan Davis Publications, Inc. Worcester, MA

Strand: VII Transportation System Course: Exploring Tech-Gr7

Time: 10 Days

Concepts	Objectives
1. Definition of Transportation	1.1 Define transportation as the movement of goods and people
	1.2 Explain the interrelationship between transportation and technology
2. Modes of Transportation	2.1 Identify and give examples of the five modes of transportation
	2.2 Participate in various activities related to transportation modes
	2.3 Compare and contrast the transportation of people and goods

Strand: VII Transportation System **Course:** Exploring Tech-Gr 7

Suggested activities	Notes
1. Class discussion: Define transportation	
2. Information sheet (packets) on TRANSPORTATION Systems and History of Transportation	
3. Pocket rocket activity sheet	
4. Balloon guideway activity sheet	

STRAND: VIII Construction COURSE: Exploring Tech-Gr7

VOCABULARY:

Construct	Dynamic
Load	Architectural
Column	Structural
Beam	Compression
Static	Efficiency Rating
Critical Load	

RESOURCES:

Living with Technology	by	Michael Hacker/Robert Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Understanding and Using Technology	by	Todd, McCrory, Todd Copyright 1985 Davis Publications
Technology in Your World	by	Hacker/Barden Copyright 1987 Delmar Publishers
Exploring Construction	by	Richard M. Henak Copyright 1985 Goodheart-Wilcox Co., Inc. South Holland, Ill

Strand: VIII Construction **Course:** Exploring Tech-Gr7

Time: 7 Days

Concepts	Objectives
1. Definition of Construction	1.1 Transform manufacturing materials in a finished product
2. Structures	2.1 Define construction as building structures
	2.2 Participate in various activities involving construction
3. Structural Loads	3.1 Design and demonstrate the principles of structural loads through construction activities
4. Structural Members	4.1 Depict examples of the structural shapes

Strand: VIII Construction Course: Exploring Tech-Gr7

Suggested activities	Notes
1. Class lecture and discussion on defining construction	
2. What do we construct?	
3. Formal definition	
4. List types of structures	
5. Discuss history of development of structures	
6. Define loading	
7. Provide examples of loading-static, dynamic, compression	
8. Provide examples of different types of structural members	
9. Fold paper to simulate structural shapes and demonstrate significant increase in strength	
10. Activity sheet on 4 card structure (Index Cards)	
11. Discuss purposes of each type of structure	

STRAND: IX Individual and Society COURSE: Exploring Tech-Gr7

VOCABULARY:

Literacy
Career
Awareness
Consumer
Society
Productive
Responsible

RESOURCES:

Living with Technology	by	Michael Hacker/Robert Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Understanding and Using Technology	by	R.Todd/D.McCrory Copyright 1985 Davis Publications
Technology in Your World	by	M. Hacker/R.Barden Copyright 1987 Delmar Publishers Albany, N.Y.

Strand: IX Individual and Society Course: Exploring Tech-Gr7

Time: 5 Days

Concepts	Objectives
1. Technological Literacy	1.1 Analyze the importance of the individual as the essential element of technology
	1.2 Define and discuss the meaning of technological literacy
	1.3 Demonstrate the knowledge of technological language
	1.4 Describe how a technologically literate populace can transform society
	1.5 Give examples of themselves using technology in a responsible manner
	1.6 Demonstrate individual responsibility through their participation in lab activities

Strand: IX Individual and Society **Course:** Exploring Tech-Gr7

Suggested activities	Notes
1. Emphasize importance of technological literacy in today's society	
2. Career awareness - list careers - and preparation for careers - What about careers not created yet?	
3. Discuss consumer awareness - How important is it to be technologically literate in order to function in today's society? To be a productive member?	

APPLYING TECHNOLOGY

GRADE 8

APPLYING TECHNOLOGY

Course Description:

Technological Processes will provide students with a series of concentrated, hands-on experiences related to the application of tools and the processing of materials relevant to Communication, Production, and Transportation/Power technology systems.

Students will be involved in a series of teacher-designed laboratory activities and experiments focusing on the tools, materials, and processes of technology.

Course GOALS

At the completion of this course the student will be able to:

1. Demonstrate and understand the use of the elements of communication, production and transportation systems:
   A. Apply the universal elements of systems
   B. Recognize the Interrelationships of elements
2. Apply problem solving and creative processes.
3. Understand and appreciate the relationship between the individual, society, and technology.
4. Understand the role of competent and responsible technologically literate people as they carry out their daily functions as informed citizens.
5. Understand the Interrelationship of the technical systems.

Grade 8 Course Title: Applying Technology

	Pub.Co.	Title of Text	Author	C.Date
*1.	Delmar	Living with Technology	M.Hacker/R.Barden	88
2.	Davis	Understanding and Using Tech.	R.Todd/D.McCrory	85
3.	Delmar	Technology in Your World	M.Hacker/R.Barden	87
4.	Davis	Resources in Technology	D.McCrory/G.Maughan	
5.	Davis	Resources in Technology-85	D.McCrory/G.Maughan	
6.	Good/Wil.	Processes of Manufacturing	Thomas Wright	87
7.	Good/Wil.	Exploring Manufacturing	Thomas Wright	85
8.	Good/Wil.	Exploring Construction	Richard Henak	85
9.	Pro.Hand.	Odyssey of the Mind	S.Micklus/C.Micklus	87
10.	Creat.Com.	Problems, Problems, Problems	T.Gourley/S.Micklus	84
11.	Creat.Com.	O-M-AHA!	Samuel Micklus	86
12.	Creat.Com.	Odyssey of the Mind	Samuel Micklus	84
13.	Har.Brace	Discovering Communication Tech.	R.Jones/J.Robb	86
14.	Good/Wil.	Construction-Materials,Methods, Careers	Jack Landers	83
15.	Good/Wil.	Manufacturing-Material Process, Management, Careers	Thomas Wright	84

VIDEOS

1.	World Finals Video Yearbook	1987 Odyssey of the Mind	
2.		Impact of Tech.on Todays Education	James Benson
3.	Karol Media	A Fitting Occupation (Videotape)	

APPLYING TECHNOLOGY - GRADE 8
9 Week Sessions = 45 Class Periods
1 Class Period = 42 Minutes

STRAND	TIME ALLOCATED Periods	Hours
I The Nature of Technology	3	2.1
II Evolution of Technology	3	2.1
III Impacts of Technology	1	.7
IV Adapting Technology	3	2.1
V Introduction to the Laboratory	1	.7
VI Communication System	5	3.5
VII Transportation System	7	4.9
VIII Production System	19	13.3
IX The Individual and Technology	3	2.1
Total Periods	45	Hours 31.5

Applying Technology
Outline

1.0 The nature of technology
- 1.1 Definition of technology
- 1.2 Human needs and wants

2.0 Evolution of technology
- 2.1 Development of knowledge, skill and tools
  - 2.1.1 Beginnings of technology
  - 2.1.2 Extending human potential
- 2.2 History of technical systems
  - 2.2.1 Communication
  - 2.2.2 Transportation
  - 2.2.3 Production
- 2.3 Technology today
- 2.4 Future of technology
- 2.5 Elements of technology
  - 2.5.1 People
  - 2.5.2 Information
  - 2.5.3 Processes
  - 2.5.4 Materials
  - 2.5.5 Tools
  - 2.5.6 Energy
  - 2.5.7 Capital
  - 2.5.8 Time
- 2.6 Systems model
  - 2.6.1 Input
  - 2.6.2 Process
  - 2.6.3 Output
  - 2.6.4 Feedback
- 2.7 Interrelationships
  - 2.7.1 Elements
  - 2.7.2 Technical systems

3.0 Impacts of technology
- 3.1 Positive & negative
  - 3.1.1 Individual
  - 3.1.2 Societal
  - 3.1.3 Technological
  - 3.1.4 Environmental

- 3.2 Known & Unknown
  - 3.2.1 Individual
  - 3.2.2 Societal
  - 3.2.3 Technological
  - 3.2.4 Environmental

4.0 Adapting technology
- 4.1 Invention and innovation
  - 4.1.1 Creativity
  - 4.1.2 Problem solving
  - 4.1.3 Research and development
- 4.2 Appropriate technology
  - 4.2.1 Creating & recreating technology
  - 4.2.2 Emerging & adopting technology
  - 4.2.3 Developed & developing countries

5.0 Introduction to lab
- 5.1 Tour and orientation
- 5.2 Safety
- 5.3 Rules

6.0 Communication Systems
- 6.1 Definition of communication
- 6.2 Communication model
  - 6.2.1 Sender
  - 6.2.2 Channel
  - 6.2.3 Receiver
  - 6.2.4 Message
  - 6.2.5 Feedback
- 6.3 Types of communiation
  - 6.3.1 Visual
  - 6.3.2 Audio
  - 6.3.3 Audio Visual

7.0 Transportation Systems
- 7.1 Definition of transportation
- 7.2 Modes of Transportation
  - 7.2.1 Land (terrestrial)
  - 7.2.2 Water (Marine)
  - 7.2.3 Air (atmospheric)
  - 7.2.4 Space
  - 7.2.5 Conduit
- 7.3 People vs. goods
- 7.4 Fixed or random route vehicles
- 7.5 Stationary or vehicular systems

8.0 Production Systems
- 8.1 Definition of production
  - 8.1.1 Processing
  - 8.1.2 Manufacturing
  - 8.1.3 Construction

8.2 Processing
- 8.2.1 Definition of processing
- 8.2.2 Extract
  - 8.2.2.1 Harvest
  - 8.2.2.2 Drill
  - 8.2.2.3 Mine
- 8.2.3 Refine

8.3 Manufacturing
- 8.3.1 Definition of manufacturing
- 8.3.2 Manufacturing processes
  - 8.3.2.1 Layout and measurement
  - 8.3.2.2 Casting and molding
  - 8.3.2.3 Forming
  - 8.3.2.4 Separating
  - 8.3.2.5 Conditioning
  - 8.3.2.6 Assembling
  - 8.3.2.7 Finishing
- 8.3.3 Manufacturing materials
- 8.3.4 Using tools
- 8.3.5 Manufacturing the product

8.4 Construction
- 8.4.1 Definition of construction
- 8.4.2 Structures
  - 8.4.2.1 Support
  - 8.4.2.2 Shelter
  - 8.4.2.3 Containment
  - 8.4.2.4 Directing
  - 8.4.2.5 Transport
- 8.4.3 Structural loads
  - 8.4.3.1 Compression
  - 8.4.3.2 Static
  - 8.4.3.3 Dynamic
  - 8.4.3.4 Tension
- 8.4.4 Structural shapes
  - 8.4.4.1 Beams
  - 8.4.4.2 Columns
  - 8.4.4.3 Inflatible structure
  - 8.4.4.4 Geodesic domes

9.0 The individual and technology
- 9.1 Technological literacy
  - 9.1.1 Impacts
  - 9.1.2 Career awareness
  - 9.1.3 Consumer awareness
  - 9.1.4 Terminology
- 9.2 Responsibility
  - 9.2.1 Individual
  - 9.2.2 Societal
  - 9.2.3 Decision Making

STRAND: I Nature of Technology COURSE: Applying Tech-Gr8

VOCABULARY:

Impact
Technology
Survival
Science
Manufacturing
Positive
Negative
Communication
Transportation

RESOURCES:

Living with Technology	by Michael Hacker/Robert Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Understanding and Using Technology	by Ron Todd, David McCrory, K.Todd Copyright 1985 Davis Publications, Inc. Worcester, MA
Technology in Your World	by Michael Hacker, Robert Barden Copyright 1987 Delmar Publishers, Inc. Albany, N.Y.

Strand: I Nature of Technology Course: Applying Tech-Gr8

Time: 3 Days

Concepts	Objectives
1. Definition of Technology	1.1 Define technology as the use of knowledge, skills, and tools to solve problems, extend human capabilities, and improve the quality of life
	1.2 Cite practical examples of how technology improves the quality of life
	1.3 Cite possible examples of how technology could improve their lives in the future
	1.4 Discuss the impact of technology from both an individual and societal viewpoint
	1.5 Describe how technology was developed through meeting human needs for food, shelter, and clothing
2. Human needs and Wants	2.1 Describe how technology was developed through meeting human needs for food, shelter, and clothing
	2.2 Analyze and defend your views as to what is the most important part of technology in your life
	2.3 Analyze the importance of the individual as the essential element of technology
	2.4 Give examples of themselves using technology in a responsible manner

Strand: I Nature of Technology Course: Applying Tech-Gr8

Suggested activities	Notes

1. Review and reinforce previously learned concepts

2. Discuss impact on daily life

3. Discuss basic needs for survival

4. Video tape "The Impact of Technology on Today's Education"
   by M. James Benson

   Suggested Text: Living with Technology
   Michael Hacker, Robert Barden
   Delmar Publishers, 1988

STRAND: II Evolution of Technology COURSE: Applying Tech-Gr8

VOCABULARY:

Tool	People
Skill	Information
Knowledge	Process
Human Potential	Materials
Feedback	Energy
Future	Capital
Systems Model	Time
Input	Output

RESOURCES:

Living with Technology	by	Michael Hacker/Robert Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Understanding and Using Technology	by	Todd, McCrory, Todd Davis Publishers
Technology in Your World	by	M. Hacker/R. Barden Delmar Publishers
Resources in Technology	by	McCrory, Maughan Davis Publishers

Strand: II Evolution of Technology Course: Ayplying Tech-Gr8

Time: 3 Days

Concepts	Objectives
1. Development of knowledge, skill and tools	1.1 Relate experience and knowledge with the development of skills and tools
	1.2 Describe how technology was developed through meeting human needs for food, shelter, and clothing
	1.3 Define and cite examples of the extension of human potential
2. History of technical systems	2.1 Identify significant developments with each of the technical systems
	2.2 Analyze and defend your views as to who is the most important part of technology in your life
3. Technology today	3.1 Analyze and defend your views as to who is the most important part of technology in your life
4. Future of technology	4.1 Cite examples and compare past and present and future technology
5. Elements of technology	5.1 Define and list what an element of technology is
	5.2 Justify the need for all element of technology as essential to the development of technology

Strand: II Evolution of Technology Course: Applying Tech Gr8

Time: 3 Days

Concepts	Objectives
6. Systems Model	6.1 Draw and label a schematic of the universal systems model
	6.2 Identify the relationship of the components of the universal systems model
	6.3 Evaluate the importance of feedback in the universal systems model
	6.4 Illustrate the interrelationship of the elements of technology within the technical systems
7. Interrelationships	7.1 Describe the interrelationships of the technical systems
	7.2 Define technological impacts as the effect something has on something else

Strand: II Evolution of Technology Course: Applying Tech.-Gr8

Suggested activities	Notes

1. Textbook assignment - Chapter 1 pp. 1-26

2. Discuss evolution of technology of Stone Age, Bronze Age, Iron Age, Agricultural Era, Industrial Revolution, Space Age, Information Age

3. Define human potential - How do we extend it?

4. Research & discuss beginnings of: transportation, communication, and production

   Text: Chapter pp.1-26

5. List ways technology impacts us everyday

6. Where will it take us?

   Activity sheet: Vanishing things, things making comeback, etc....

7. Define and cite examples of each:
   Text: Chapter 2 - pp. 27-46
   Resources for Technology

   Activity: Collage with each of the elements of technology. Divide class into groups

8. Information sheet - Systems model

9. Text: Chapter 3 pp.47-79
   Systems and Problem Solving

10. Activity: Each student select one technological device and analyze it according to the systems model

11. Discuss: How do the elements make up a technical system?

STRAND: III Impacts of Technology COURSE: Applying Tech-Gr8

VOCABULARY:

Positive
Negative
Societal
Individual
Environmental
Technological
Known
Unknown
Consequences
Ideate

RESOURCES:

Living with Technology	by	M. Hacker/R. Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Understanding and Using Technology	by	Todd, McCrory, Todd Davis Publications

Strand: III Impacts of Technology Course: Applying Tech-Gr8

Time: 1 Day

Concepts	Objectives
1. Positive/Negative	1.1 Classify the impacts of technology as individual, societal, technical, and environmental
	1.2 Investigate the positive and/or negative impacts of technology
	1.3 Discuss the impacts of the technical system and their relationship to society
Known/Unknown	2.1 Identify the impacts of technology as known and unknown

Strand: III Impacts of Technology Course: Applying Tech.-Gr8

Suggested activities	Notes

1. List both positive and negative impacts for each of the following:
   Individual
   Societal
   Technological
   Environmental

2. Discuss impacts of technology-known and unknown

3. Careers - Future work force

STRAND: IV Adapting Technology COURSE: Applying Tech-Gr8

VOCABULARY:

Invention
Innovation
Emerging
Adopting
Appropriate

RESOURCES:

Living with Technology	by	Michael Hacker/Robert Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Understanding and Using Technology	by	Todd, McCrory, Todd Davis Publications
Odyssey of the Mind	by	S. Micklus/C. Micklus Copyright 1987 Pro. Handbook
Problems, Problems, Problems	by	T.Gourley/S.Micklus Copyright 1984 Creative Com.
O-M-OHA!	by	Samuel Micklus Copyright 1986 Creative Com.
Odyssey of the Mind	by	Samuel Micklus Copyright 1986 Creative Com.

Strand: IV Adapting Technolgy Course: Applying Tech-Gr8

Time: 3 Days

Concepts	Objectives
1. Invention and innovation	1.1 Compare and contrast invention and innovation
	1.2 Justify the need for the adaption of technology
	1.3 Display creative processes through the invention of improvement upon technology to fulfill a need or problem
	1.4 Explain how problems are solved through research and development
2. Appropriate	2.1 Define appropriate technology
	2.2 Compare the impacts of specific technologies to different cultures
	2.3 Hypothesize how existing technologies must be adapted to different cultures
	2.4 Cite examples of developed and developing countries

Strand: IV Adapting Technology Course: Applying Tech.-Gr8

Suggested activities	Notes
1. Review questions 1-10 p.80 Text	
2. Discussion on creating and recreating technology	
3. Emerging and adopting technology	
4. Developed and developing countries	

STRAND: V Introduction to Lab COURSE: Applying Tech-Gr8

VOCABULARY:

Safety
Common Sense
Rules
Patience
Abuse
Verbal
Physical
Positive

RESOURCES:

Living with Technology by Michael Hacker/Robert Barden
Copyright 1988
Delmar Publishers
Albany, N.Y.

Strand: V Introduction to Lab Course: Applying Tech-Gr8

Time: 1 Day

Concepts	Objectives
1. Tour and orientation	1.1 Locate and identify the physical layout of lab facilities
2. Safety	2.1 Follow and exhibit appropriate and safe lab procedures
3. Rules	3.1 Follow and exhibit appropriate and safe lab procedures

Strand: V Introduction to Lab Course: Applying Tech.-Gr8

Suggested activities	Notes
1. Have class tour laboratory, allow for questioning, explain purpose and function of significant areas	
2. Stress importance of safety and all times - number one priority	
3. Safety is on-going, constantly being stressed with each new activity	
4. Keep it simple	
5. Rule No. 1 - Absolutely no abuse to any person or thing, either physically or verbally - EVER!	
6. Stress positive behavior - courtesy, helping others, understanding, patience, etc....	

STRAND: VI Communication System COURSE: Applying Tech-Gr8

VOCABULARY:

Communication
Communication Model
Visual
Audio
Audio-Visual
Senses
Sender
Message
Receiver
Channel
Feedback

RESOURCES:

Living with Technology	by	Michael Hacker/Robert Barden Copyright 1988 Delmar Publishers Albany,N.Y.
Discovering Comm. Tech.	by	Janet L. Robb Copyright 1986 Harcourt Brace
Understanding and Using Tech.	by	R.Todd/D.McCrory Copyright 1985 Davis Publications
Technology In Your World	by	M.Hacker/R.Barden Copyright 1987 Delmar Pub.
Resources in Technology-85	by	D.McCrory/G. Maughan Davis Pub.

Strand: VI Communication Systems Course: Applying Tech-Gr8

Time: 5 Days

Concepts	Objectives
1. Definition of	1.1 Define communication as effectively sending and receiving messages
	1.2 Explain the interrelationships between communication and technology
	1.3 Explain that understanding the message is the key to all communication
2. Communication Model	2.1 Draw and label the communication model
3. Types of Communication	3.1 Designate and describe the three types of communication: visual, audio, and audio-visual
	3.2 Relate the five senses to the communication process
	3.3 Participate in various activities involving the different types of communication

Strand: VI Communication System Course: Applying Tech.-Gr8

Suggested activities	Notes

1. Text: Chapter 5 pp.123-137
2. Discuss: What is communication? (p.124)
3. When did communication begin
4. Information sheet: Communication model
5. Define: sender, message, channel, receiver, feedback
6. Discuss who communicates?
7. Discuss: How do we communicate?
8. Communication senses
   Explain: Visual, audio, audio-visual
9. Information sheet: designing the message
   Activity: Simulated light wave communication model provide activity sheets (packet)
   Have students read articles about computer technology. Introduce students to computer graphics.

STRAND: VII TRANSPORTATION SYSTEMS COURSE: Applying Tech-Gr8

VOCABULARY:

Transportation
Terrestrial
Marine
Atmospheric
Modes
Fixed Route
Random Route
Space
Stationary
Vehicular
Degree of Freedom

RESOURCES:

Living with Technology	by	M.Hacker/R.Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Understanding & Using Technology	by	R.Todd/D.McCrory Copyright 1985 Davis Pub.
Technology in Your World	by	M.Hacker/R.Barden Copyright 1987 Delmar Pub.
Resources in Technology-85	by	D.McCrory/G.Maughan Davis Pub.
Resources in Technology	by	D.McCrory/G.Maughan Davis Pub.

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Strand: VII Transportation System Course: Applying Tech-Gr8

Time: 7 Days

Concepts	Objectives
1. Definition of Transportation	1.1 Define transportation as the movement of goals and people
	1.2 Explain the interrelationship between transportation and technology
2. Modes of Transportation	2.1 Identify and give examples of the five modes of transportation
	2.2 Participate in various activities related to transportation modes
3. People vs. goods	3.1 Compare and contrast the transportati of people and goods
4. Fixed or random route vehicles	4.1 Distinguish between fixed and random route vehicles
	4.2 Evaluate the need for fixed and random route vehicles
5. Stationary or vehicular systems	5.1 Explain the difference between stationary and vehicular systems

Strand: VII Transportation Systems Course: Applying Tech.-Gr8

Suggested activities	Notes

1. Text: Chapter 15 pp. 437-481 Transportation
2. Discuss: Transportation definition
3. History of transportation
4. How does transportation affect us?
5. Present examples and discuss each of the following: Land (Terrestrial)
   Water (Marine)
   Air (Atmosphere)
   Space
   Conduit
6. Activity: Have class list examples of how people and goods are transported and categorize them according to fixed or random route, and stationary or vehicular systems.
7. Activity: Mouse trap powered vehicle

STRAND: VIII Production Systems COURSE: Applying Tech-Gr8

Vocabulary:

Production	Load
Processing	Dynamic
Manufacturing	Static
Raw Materials	Compression
Industrial Materials	Tension
Construction	Beams
Support	Columns
Shelter	Channels
Containing	Girder
Directing	
Transporting	

Resources:

TEXT: Living with Technology	by Michael Hacker/Robert Barden Copyright 1988 Delmar Publishers Albany, N.Y.
Exploring Manufacturing	by Thomas Wright Copyright 1985 Good/Wilcox
Exploring Production	by Richard Henak Copyright 1985 Good/Wilcox
Problems,Problems,Problems	by T.Gourley/S.Micklus Copyright 1984 Creative Com.
Understanding & Using Tech.	by R.Todd/D.McCrory Copyright 1985 Davis Pub.
Technology in Your World	by M.Hacker/R.Barden Copyright 1987 Delmar Pub.

Strand: VIII Production Systems Course: Applying Tech-Gr8

Time: 19 Days

Concepts	Objectives
1. Definition of production	1.1 Define production as any activity that yields or creates a product
	1.2 Explain the interrelationship of production and technology
	1.3 List the three sub-systems of production: processing, manufacturing, and construction
2. Processing	2.1 Define processing as extracting raw material from nature and altering it for direct use by consumers or for use in construction and manufacturing
	2.2 Explain the extracting process of harvesting, drilling, and mining
	2.3 Contrast the difference between extracting and refining
	2.4 Describe extracting as a gathering
	2.5 Describe refining as a changing process
3. Manufacturing	3.1 Define manufacturing as the making of products
	3.2 Identify and apply the seven manufacturing processes through examples used in the lab
	3.3 Choose and evaluate appropriate materias in the manufacturing of a product

Strand: VIII PRODUCTION SYSTEMS Course: Applying Tech-Gr8

Time: 19 Days

Concepts	Objectives	
3. Manufacturing(Cont)	3.4	Display development of manipulative skills through the proper use of selected tools
	3.5	Select and demonstrate safe use of tools in the lab
	3.6	Demonstrate appropriate safety procedures in the utilization of manufacturing processes, materials, and tools in the lab
	3.7	Demonstrate the application of creative problem solving through manufacturing processes in the creation of a product
	3.8	Apply adaptive technology principles to the creation of a product in the lab
	3.9	Transform manufacturing materials in a finished product
4. Construction	4.1	Define construction as building structures
	4.2	Identify through example, the five different types of structures
	4.3	Design and demonstrate the principles of structural loads through construction activities
	4.4	Depict examples of the four structural shapes

Strand: VIII Production Systems Course: Applying Tech.-Gr8

Suggested activities	Notes

1. Discuss student definitions
2. How do we produce? What three ways do we produce?
3. Text: Chapter 8, pp.213-252 Processing Materials
4. Definition of processing
5. Discuss industrial materials
6. Video tape: The Manufacture of Pint and Hardwood Lumber by Catskill Mt. Lumber Co.
7. Text: Chapter 9, pp.253-284 MANUFACTURING
8. Definition of manufacturing
9. History of manufacturing - when did it begin?
10. List manufacturing materials
11. Manufacturing processes - List and explain each - have class cite examples of each
12. Video Tape: The Manufacture of Reconstituted Wood Products - by Catskill Mt. Lumber Co.

    Activity: Coat rack to hand on door
13. Define construction
    TEXT: Chapter 10 pp.285-314 Construction

Strand: VIII Production Systems Course: Applying Tech.-Gr8

Suggested activities	Notes

14. List and explain types of structures
    - Support
    - Shelter
    - Containing
    - Directing
    - Transporting

15. Give examples of each

    Activity: Divide class into groups - Do a collage for each of the five types of structures from magazines, newspapers, etc.....

16. Structural loads - write definition of each:
    Compression - Static - Dynamic - Tension

17. Structural shapes - List and identify the following: Beams - Columns - Channels

    Activity: Strategy structure (from O-M Assoc)

STRAND: IX The Individual and Tech. COURSE: Applying Tech-Gr8

VOCABULARY:

Values
Impacts
Consumer Awareness
Career Awareness
Responsibility
Decision making
Application
Industry

RESOURCES:

Living with Technology	by	M.Hacker/R.Barden Copyright 1988 Delmar Pub. Albany, N.Y.
Resources in Technology	by	D.McCrory/G.Maughan Davis Pub.
Resources in Technology-85	by	D.McCrory/G.Maughan Davis Pub.
Understanding and Using Technology	by	R.Todd/D.McCrory Copyright 1985 Davis Pub.
Technology in Your World	by	M.Hacker/R.Barden Copyright 1987 Delmar Pub.

Strand: IX Individual and Technology Course: Applying Tech-Gr8

Time: 3 Days

Concepts	Objectives
1. Technological Literacy	1.1 Analyze the importance of the individual as the essential element of technology
	1.2 Define and discuss the meaning of technological literacy
	1.3 Demonstrate a knowledge of technological language
	1.4 Analyze and hypothesize the technological impacts
	1.5 Categorize careers related to the technical systems
	1.6 Evaluate the need for technological literacy to increase their consumer awareness
2. Responsibility	2.1 Give examples of themselves using technology in a responsible manner
	2.2 Demonstrate individual responsibility through their participation in lab activities
	2.3 Relate how individual responsibility affects society and how society affects the individual
	2.4 Describe and justify their own decision making as it is relative to the responsible application of technology

Strand: IX Individual and Technology Course: Applying Tech.-Gr

Suggested activities	Notes
1. List values and impacts of technology	
2. Activity - review questions p.314 No. 170	
3. Discussion on Careers related to production industry	
4. Consumer awareness - How does this affect me?	
5. Discuss responsible application of technology in reference to the individual and society in general	
6. What significance will technology play in decision making strategies? Support your answer	

TECHNOLOGICAL ENTERPRISE

GRADE 9

TECHNOLOGICAL ENTERPRISE

Course Description:

Technological Enterprise will provide students with the opportunity to apply the knowledge and skills developed in the Introduction to Technology Systems and Technological Processes courses to the creation and operation of an enterprise system (company).

Students will form a company for the purposes of producing a product or providing a service. Students will function in various capacities within the enterprise by applying Communication, Production, and Transportation/Power technology.

Course "Goals"

At the completion of this course the student will be able to:

1. Describe how an enterprise system works.
2. Explain the hierarchy of a typical manufacturing organization.
3. Distinguish the role that research and development plays in manufacturing.
4. Explain the marketing aspect of a manufacturing enterprise and its importance in the success of the company.
5. Identify and perform all processing operations and develop flow charts from beginning to final product.
6. Perform product quality control, evaluation, and cost analysis.

Grade 9 Course Title: Technological Enterprise

	Pub.Co.	Title of Text	Author	C.Date
*1.	Good/Wil.	Exploring Manufacturing	R.Wright	85
2.	Good/Wil.	Exploring Production	R.Wright M.Henak	85
3.	Good/Wil.	Manufacturing-Material Processing, Management Careers	R.Wright	84
4.	Good/Wil.	Construction - Materials, Methods, Careers	Jack Landers	83
5.	Good/Wil.	Processes of Manufacturing	R.Wright	87
6.		CITE,Center for Implementing Technology Education MF-P-014 Introduction to Assembly	R.Shackleford	
7.	Davis	Understanding and Using Technology	Karen Todd	85
8.	School Shop.	January, 1988		
9.	School Shop.	May, 1986		
10.	School Shop.	August, 1986		

VIDEOS

11.	Technology in Action	The Manufacture of Pine and Hardwood Lumber from Catskill Mt. Lumber Co. Swan Lake, N.Y.
12.	The American Enterprise Series	

*Text that was selected first choice

TECHNOLOGICAL ENTERPRISE - GRADE 9
1 FULL YEAR = 180 CLASS PERIODS
1 CLASS PERIOD = 42 MINUTES

Strand	Time Allocated	
	Periods	Hours
I. Introduction to Technological Enterprise	15	10.5
II. Selecting the Product	30	21.0
III. Research and Development	35	24.5
IV. Marketing	15	10.5
V. Production	75	52.5
VI. Analysis	10	7.0
TOTAL	180	126.0

Technological Enterprise
Outline

1.0 Introduction to Technological Enterprise
- 1.1 Define terms:
  - 1.1.1 Technology (review)
  - 1.1.2 Communication (review)
  - 1.1.3 Transportation (review)
  - 1.1.4 Production (review)
  - 1.1.5 Enterprise
  - 1.1.6 Company
  - 1.1.7 Tools
  - 1.1.8 Processes
- 1.2 Organization of Enterprise System (Explain each)
  - 1.2.1 President
  - 1.2.2 Engineer
  - 1.2.3 Industrial Consultant (teacher)
  - 1.2.4 Vice President - R & D
  - 1.2.5 Vice President - Prod.
  - 1.2.6 Vice President - Mktg.
  - 1.2.7 Foreman (3)
  - 1.2.8 Workers
  - 1.2.9 Union Steward

2.0 Selecting the Product
- 2.1 Brainstorming
- 2.2 Survey
- 2.3 Sketches of Product Ideas - See School Shop Jan. 1988. Pg. C-D
- 2.4 Market Survey (100 people min.)
  - 2.4.1 Present ideas to class and vote

3.0 Research and Development
- 3.1 Construct Prototype
- 3.2 Sample to Market to Sell Stock
- 3.3 Design and Construct jigs and fixtures
- 3.4 Conduct test on materials, processes, finishes, packaging
- 3.5 Flow charts

4.0 Marketing
- 4.1 Advertising *
- 4.2 Display Prototype (3-Gum. M&M's. Peanuts)
- 4.3 Packaging
  - 4.3.1 Design-Logo*
  - 4.3.2 Protection
- 4.4 Distribution

5.0 Production
- 5.1 Consult R&D Flow Charts
- 5.2 Conveyor Systems **
- 5.3 Equipment Placement
- 5.4 Time study
- 5.5 Product Handling (Materials handling)**
  - 5.5.1 Conveyor**
  - 5.5.2 Tote carts
  - 5.5.3 Bins
- 5.6 Quality control checks
- 5.7 Assembly
- 5.8 Finishing
- 5.9 Packaging and Labeling
- 5.10 Warehousing

6.0 Analysis
- 6.1 Product
- 6.2 Assembly procedures
- 6.3 Tooling
- 6.4 Marketing
- 6.5 Time study-efficiency
- 6.6 Packaging
- 6.7 Investment/return (Cost analysis)

*Communications technology
**Transportation technology

STRAND: I INTRO TO TECH ENTERPRISE COURSE: Tech.Enter.-Gr9

VOCABULARY:

- Manufacturing
- Enterprise
- Enterprise System
- Production
- Industry
- Company

RESOURCES:

Manufacturing-Material Processing, Management Careers	by R.Wright Copyright 1984 Good/Wilcox
Understanding and Using Technology	by Karen Todd Copyright 1985 Davis Pub.
The American Enterprise Series	

Strand: I INTRO TO TECH ENTER. Course: Technological Enter-Gr9

Time: 15 Periods = 10.5 Hours

Concepts	Objectives
1. Define terms	1.1 Students will be able to define terms, including technology, communication, transportation, production manufacturing, enterprise system
2. Organization of Enterprise System	2.1 Students will be able to label a schematic of the structure of an enterprise system
	2.2 Define each position within the enterprise system
	2.3 Participate in a discussion of the responsibilities associated with each position within the enterprise system, compiling a job description for each position

Strand: I B Intro to Tech. Enterprise Course: Technological Enter-Gr9

Suggested activities	Notes
1.1 1. Review terms: technology, communication, transportation, production 2. Introduce the enterprise system - Define VIDEO TAPE: The American Enterprise series of 5-28 minute video tapes dealing with economic history of enterprise system. TEXT: Read chapters 1-4 pp 1-27 Manufacturing, by R. Thomas Wright 1984 Goodheart-Wilcox, South Holland, I	
1.2 1. Overhead transparency = structure of Enterprise System 2. Define each position 3. Discuss responsibilities associated with each 4. Information sheet: organization of system	

STRAND: II Selecting the Product COURSE: Tech.Enter.-Gr9

VOCABULARY:

Brainstorming
Think tank
Sketch
Market Survey
Ideation
Negotiating Ideas
Research and Development
Cost Estimate

RESOURCES:

Manufacturing-Material Processing, Management Careers	by	R. Wright @ 1984 Good/Wilcox Pub.
Exploring Production	by	R. Wright @ 1985 Good/Wil
Exploring Manufacturing	by	R. Wright @ 1985 Good/Wil.
Processes of Manufacturing	by	R. Wright @ 1987 Good/Wil.

School Shop January, 1988

School Shop May, 1986

School Shop August, 1986

Strand: II Selecting Product Course: Technological Enter-Gr9

Time: 30 Periods = 21 Hours

Concepts	Objectives
1. Brainstorming	1.1 Student will participate in brainstorming activities for product selection, adhering to specified rules
2. Survey	2.1 Organize research and development teams, producing planning boards and flow charts for potential products
3. Sketches of Product Ideas	3.1 Present product prototypes as developed by their Research and Development teams, explaining and depending their product's development scheme and predicting its success
4. Market Survey	4.1 Conduct a market survey to determining product feasibility and price acceptability with
	4.2 Compare predicted success with Research and Development team products with survey results

Strand: II Selecting Product Course: Technological Enter-Gr9

Suggested activities	Notes
1.1 1. Definition of brainstorming - Use "Think tank" concept - allow individual time to dwell on ideas - then permit ideation and exchange of ideas - Negotiate ideas Info sheet: Designing products for manufacture	
1.2 1. Act.Sheet: Research and development - first planning board	
1.3 1. Students will present ideas as sketches to class - explain and describe Act.Sheet: Product idea rating sheet Act.Sheet: Preliminary cost estimate sheet Act.Sheet: Product sketch sheets	
1.4 1. Divide class into groups of 5-6 2. Minimum of 100 people to be surveyed 3. Determine people needs and wants 4. Price range acceptability 5. Present findings to class and vote on one 6. Text assignment - Manufacturing, Chapter 24 pp 203-215 7. Act.Sheet: Product selection ballot	

STRAND: III Research and Development COURSE: Tech.Enter-Gr9

VOCABULARY:

Prototype	Roll of materials
Aesthetics	Material Processing
Durability	Function
Acceptability	Appeal
Affordability	Efficiency
Jigs	Fixture
Consumer Appeal	Logo
Flow Chart	Sequential
Manufacturing Engineerings	

RESOURCES:

Manufacturing-Material Processing, Management Careers	by	R. Wright @ 1984 Good/Wilcox
Exploring Production	by	R. Wright @ 1985 Good/Wilcox
Processes of Manufacturing	by	R. Wright @ 1987 Good/Wilcox

Strand: III Research/Development Course: Technological Enter-Gr9

Time: 35 Periods = 24.5 Hours

Concepts	Objectives
1. Construct Prototype	1.1 Select appropriate materials for prototype products, based upon function, aesthetics and cost analysis
	1.2 Process selected materials to construct prototype products
	1.3 Test product for function and quality
2. Sample to market	2.1 Conduct a market survey with prototype products to determine appeal, and affordability
3. Design/construct	3.1 Design jigs and fixtures to efficiently and accurately facilitate production
	3.2 Test jigs and fixtures for safety, accur[illegible] and efficiency and ease of manipulation
	3.3 Select jigs and fixtures for production
4. Conduct test on materials, processes, finishes, packaging	4.1 Examine possible product finishes for durability, appeal, ease of application and cost
	4.2 Develop a product package which incorporates protection and ease of assembly
	4.3 Design a logo which visually portrays the product, enhances the product package and identifies the company
5. Flow charts	5.1 Organize flow charts of the manufacturing process including materials handling, tooling and quality control

Strand: III Research/Development Course: Technological Enter-Gr9

Suggested activities		Notes
3.1	1. Determine role of materials	
	2. Select materials on basis of function, aesthetics cost	
	3. Material processing	
	4. Testing for durability, function, acceptability	
3.2	1. Does it appeal to consumer?	
	2. Affordability	
	3. Human needs and wants	
3.3	1. Students will create and test efficiency and accuracy of jigs and fixtures	
	2. Select only those with highest degree of safety, accuracy, and efficiency	
	3. Manipulative ease	
3.4	1. Check for durability, fits, ease of operation, aesthetic appeal	
	2. Durability of finish, will type of finish affect intended use? Ease of application	
	3. Packaging material - is it protective of contents? Cost? Consumer appeal?	

Suggested activities		Notes
3.4	4. Design logo on package	
	5. Packaging must: promote product: protect the product: provide necessary information about product	
3.5	1. Develop and list sequential operations	
	2. Do material handling stucy	
	3. Production planning	
	4. Manufacturing Engineering	
	5. Tooling	
	6. Operation, transportation, inspection, delay, storage	

STRAND: IV Marketing COURSE: Tech.Enter-Gr9

VOCABULARY:

Advertising
Persuasive
Components
Promote
Direct Sales

RESOURCES:

Manufacturing-Material Processing. Management Careers	by	R. Wright @ 1984 Good/Will
Exploring Production	by	R. Wright @ 1985 Good/Will
Processes of Manufacturing	by	R. Wright @ 1987 Good/Will

Strand: IV Marketing Course: Technological Enter-Gr9

Time: 15 Periods = 10.5 Hours

Concepts	Objectives	
1. Advertising	1.1	Select a product name, considering nature of the product, logo development and consumer appeal
	1.2	Produce an advertising campaign which is action oriented, persuasive, informative and attention getting
2. Display/show prototype	2.1	Develop a display which present the product for public inspection
3. Packaging	3.1	Examine possible product finishes for durability, appeal, ease of application and cost
4. Distribution	4.1	Canvas community with advertising materi ; and obtain product orders
	4.2	Contact local business for placement of products for direct sales

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Strand: IV Marketing Course: Technological Enter-Gr9

Suggested activities	Notes
4.1 1. Product advertising	
2. Components of good advertisement: Must attract attention Be informative Persuasive Cause action	
3. Product name selection	
4.3 1. Select material	
2. Select material	
3. Design and create prototype of package	
4. Design logo	
5. Package must: Protect product: promote: provide necessary information about product	
4.4 1. Fill orders (info. sheet: Customer order form)	
2. Provide for direct sales	

STRAND: V Production COURSE: Tech.Enter.-Gr9

VOCABULARY:

Quality Control	Optimum Product
Conveyor	Productivity
Time Study	Tolerances
Gauges	Salvage
Rework	Finishing
Inventory	

RESOURCES:

Manufacturing-Material Processing. Management Careers	by R. Wright @ 1984 Good/Will.
Exploring Manufacturing	by R. Wright @ 1985 Good/Will.
Processes of Manufacturing	by R. Wright @ 1987 Good/Will.
CITE.Center for Implementing Technology Education MF-P-014 Introduction to Assembly	by R. Shackleford

Strand: V Production Course: Technological Enter-Gr9

Time: 75 Periods = 52.5

Concepts	Objectives
1. Consult R&D Flow Charts	1.1 Organize assembly line stations as designed in flow charts
	1.2 Establish quality control checkpoints to insure product quality
2. Conveyor Systems	2.1 Design and construct in-plant transportation systems, including materials, conveyance mechanisms and completed product transport
	2.2 Designate product storage area to provide secure inventory
3. Equipment placement	3.1 Analyze assembly line station and readjust if necessary to optimize space and efficient operation
4. Time study	4.1 Design and conduct a time study of all operations of the assembly process
5. Materials Handling	5.1 Design and construct in-plant transportation systems, including materials, conveyance mechanisms and completed product transport
6. Quality Control Checks	6.1 Design and construct quality control devices to check product component and assembly
7. Assembly	7.1 Determine standards for tolerance of product components and assembly

Strand: V Production Course: Technological Enter-Gr9

Suggested activities	Notes
5.1 1. Text: 1. Chapter 18 - Production pp. 137-150 2. Establish operations needed 3. Assembly stations 4. Quality control points should be strategically located to insure optimum product	
5.2 1. Materials handling from station to station 2. Develop simplified conveyor system 3. Provide storage facility	
5.3 1. Organize flow and work stations to maximize safety, performance, productivity, and most efficient use of available space	
5.4 1. Calculate times needed to perform tasks at operation points - record and average times	
5.5 1. Design conveyor systems, storage systems, tote carts, etc... provide for material storage when not in production	

Strand: V Production Course: Technological Enter-Gr9

Time:

Concepts	Objectives
8. Finishing	8.1 Examine possible product finishes for durability, appeal, ease of application and cost
	8.2 Establish a finishing area which provides adequate ventilation, safety and quality
9. Packaging and labeling	9.1 Apply graphic information to packaging
	9.2 Package completed and inspected product
10. Warehousing	10.1 Design and construct in-plant transportation systems, including materials, conveyance mechanisms and completed product transport
	10.2 Delegate managerial responsibility for inventory maintenance

Strand: V Production Course: Technological Enter-Gr9

Suggested activities	Notes
5.6 1. Determine standards, establish tolerances	
2. Build gages to inspect	
3. Inspect individual parts and assemblies	
4. Salvage and rework parts when possible	
5.7 1. Activity packet: Introduction of Assembly from CITE - MF-P-014 by Ray Shackleford	
5.8 1. Select most appropriate finish	
2. Provide adequate finishing facilities: Ventilation, worker safety, safe areas	
	1.Chapter 11. Finishing processes pp.81-86
5.9 1. Select packaging material suitable for particular product	
2. Does it protect the product?	
3. Design logo for package	
4. Design necessary information on package in reference to contents	
5. Package must be effective	

Strand: V Production Course: Technological Enter-Gr9

Suggested activities	Notes
5.10 1. Provide suitable and safe storage for excess product 2. Maintain inventory	

STRAND: VI Analysis COURSE: Tech.Enter-Gr9

VOCABULARY:

Product Evaluation	Assembly Processes
Bonding	Mechanical Fastening
Adhesive Bonding	Templates
Marketing Strategy	Quality

RESOURCES:

Manufacturing-Material Processing, Management Careers	by	R. Wright @ 1984 Good/Wilcox
Exploring Production	by	R. Wright @ 1985 Good/Wilcox
Processes of Manufacturing	by	R. Wright @ 1987 Good/Wilcox

Strand: VI Analysis Course: Technological Enter-Gr9

Time: 10 Periods = 7 Hours

Concepts	Objectives	
1. Product	1.1	Develop a checklist for enterprise members to evaluate product as a finished piece of merchandise.
2. Assembly procedures	2.1	Evaluate assembly procedures, considering efficiency during process, durability, appearance
3. Tooling	3.1	Analyze the assembly process, including efficiency, tooling, quality control devices, jigs and fixtures, etc.
4. Marketing	4.1	Review marketing strategies and their relationship to sales
5. Time study-efficiency	5.1	Examine time studies and isolate areas of inefficiency
6. Packaging	6.1	Critique packaging for ease of assembly, appearance, logo design and information
7. Investment/Return	7.1	Audit expenditure and resources to determine if the enterprise was profitable
	7.2	Propose recommendations to increase profit and reduce waste
	7.3	Review evaluation section 1-6 and compile an annual report, specify net worth, loss, gain and recommendation for improvement of the enterprise system.

Strand: VI ANALYSIS Course: Technological Enter-Gr9

Suggested activities	Notes
6.1 1. Evaluate overall appearance, function, appeal, role of materials	
6.2 1. Define assembly processes: Bonding Mechanical fastening Adhesive bonding	
2. Read Chapter 10 - Assembly processes pp.71-79	
3. Evaluate efficiency and long lasting effects of assembly process used	
6.3 1. Evaluate accuracy, ease of application, safety, efficiency, and durability of all jigs, fixtures, patterns, templates etc...	
6.4 1. Evaluate marketing strategies - how successful was campaign?	
2. List ways to improve strategies	
3. Discuss performance - how can we improve	
6.5 1. Was manufacturing system efficiently run? List delays, major gliches, inefficient operations etc....	
2. How can we improve on production time?	
3. Is time more important than quality? Support your answer	

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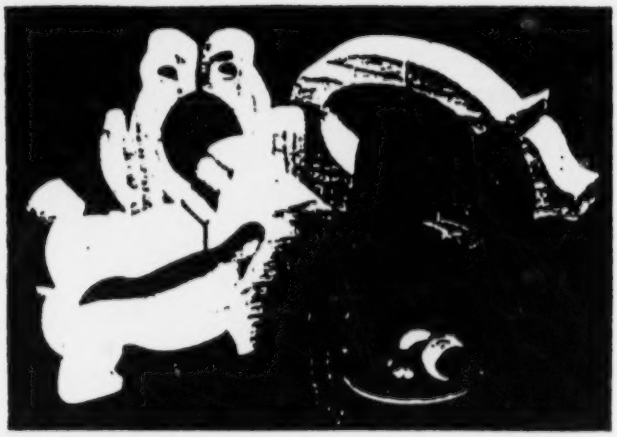
Suggested activities	Notes
6.6 1. Is package capable of protecting contents?	
2. Is it attractive and eye catching?	
3. Does it contain necessary information on contents	
6.7 1. How successful was the enterprise financially?	
2. Did it show a profit?	
3. What can be done to improve profit and returns	
4. Can waste be eliminated?	

Animal-Shaped Banks Combine Practice with Wood and Plastic



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By David Wiepert

THESE animal banks offer a nice, inexpensive project suitable for grades 6-9 that uses both wood and acrylic. The banks shown in the picture present just a few design ideas. Students can use their creativity to formulate their own shapes. The project will allow them to show their talents while learning the basics of wood- and plastic-working tools and machines.

David Wiepert is an industrial arts teacher, Alden (New York) Central Middle School.

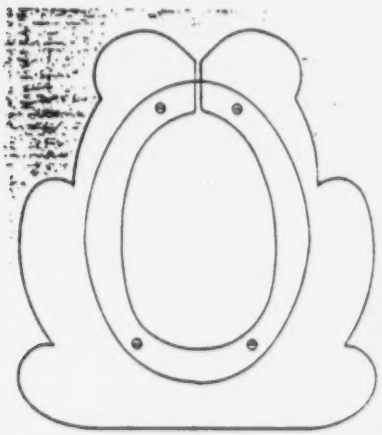

Fig. 1—Pattern for frog

Procedure

1. Make a pattern of the animal on paper or cardboard. Because students sometimes have difficulty with this, you may want to have them use instructor-made templates. Select wood (you'll find 2 × 6 pine easy to work). Trace the pattern on the wood. At this time, you can also draw the section in the center that will be cut out. The thickness of the wood remaining between the center and the outside edge should measure 3/4" to 1" to decrease the chance of breakage. Screwing the acrylic in place will further strengthen the bank.

2. Cut out the outer pattern of the bank. Smooth outside areas—I prefer to do this now because the wood is stronger before you cut out the inside. Make the coin slot. You can cut the slot in either direction, but making it as shown in Fig. 1 allows easy entrance for the saw blade. If desired, you can also drill holes with a 1/4" drill and file the edges to form the slot.

3. Cut the inside pattern. Smooth all the areas of the bank. Apply finish, natural or stained, as desired.

4. Lay out the pattern on the acrylic so the plastic overlaps the wood by 1/2". Cut the plastic, sand, and polish. Mark locations to drill 1/8" holes for screws, and drill. Assemble the project using 1/2" No. 2 screws. This makes it easier for students to remove their savings.

Your students should find this project rewarding. You can help keep your budget low by hunting for scraps from manufacturers in your area. Once you have completed your first animal bank, you may want to modify the design. □

Bill of Materials

Qty.	Description
1	2" × 6" × 8" pine or other wood
2	Pieces of 1/8" acrylic
8	No. 2 round-head screws, 1/2" long
	Finishing materials—stain, varnish, etc.

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By George Storm

A comprehensive approach to both the prevention and solution of common occupational laboratory problems. This book offers guidelines and instructional management competencies for: equipment and supply selection, facilities planning, material control, maintenance and records, safety, organizing personnel, and budget preparation.

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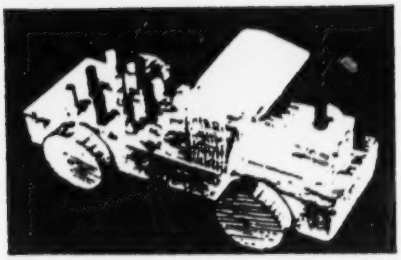


Teach Basic Woods Skills with a Tic-Tac-Toe Truck

By Bill Klements

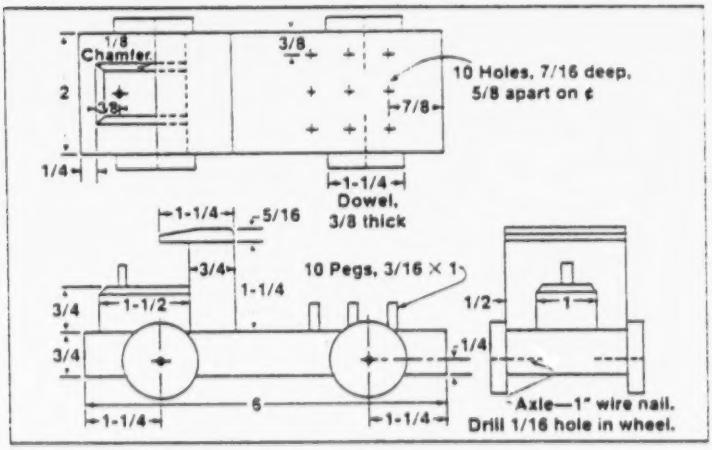


Fig. 1—Working drawing

Steps for Completing Sixth-Grade Industrial Arts Projects Name _____

Game Board or Tic-Tac-Toe Truck

Steps	Tools and Materials
1. Cut stock to rough length.	Bench rule, try square, backsaw, vise, pencil
2. Square one end. Use true edge.	Try square, block plane and/or wood file
3. Plane rough side (edge).	Block or smooth plane
4. Square second end to size. Use true edge.	Bench rule, try square, backsaw, block plane, wood file
4a. For truck, do all pieces.	
5. Lay out holes. Double check measurements.	Bench rule, try square
6. Mark all holes with scratch awl.	Scratch awl
7. Lay out chamfers.	Marking gauge
8. Plane chamfers. Do side grain first.	Block plane, bench hook
9. Drill game holes.	Hand drill and 13/64" twist bit, depth gauge
10. Countersink holes.	Hand drill, countersink
11. Sand all surfaces. Sand edges and ends last.	Sanding block, 100 and 150 grit
12. Sand ends of pegs.	Scrap sandpaper
13. Finish project. Sand first coat while wet. Wipe dry immediately. Place no finish in areas that are to be glued.	*Bring rag.* Danish oil (choice of colors)
14. Apply second coat—do not sand—and wipe dry.	
15. Apply wax coat and polish.	Wax
16. Finish pegs.	

Truck extra steps:

1. Lay out axle locations.	Bench rule, scratch awl
2. Shape cab-over.	Block plane and/or wood rasp, file
3. Find center of wheels.	Center gauge, sloyd knife
4. Drill holes in wheels.	Hand drill, 1/16" twist bit
5. Locate all pieces in position and mark, then finish all pieces. (See steps 13-16.)	Sloyd knife
6. Place fastening nails.	Pliers, 1/2" brads (heads cut off)
7. Apply glue and assemble.	Wood glue, hand screw clamp or vise
8. Attach wheels.	Curved claw hammer

Fig. 2—Plan sheet

EVERY sixth-grade student in our middle school takes a nine-week industrial arts class consisting of basic mechanical drawing and basic bench woodworking. Of the several small projects that have been used in the woodworking portion, the Tic-Tac-Toe Truck has become a student favorite.

After being introduced to hand woodworking tools, nomenclature, and usage, students are given the opportunity to choose one of three projects to build, one of which is the truck. The Tic-Tac-Toe Truck has two uses for this age group, as a game and as a toy.

A working drawing (Fig. 1), plan sheet, and patterns are provided. For the truck, the plan sheet (Fig. 2), used for two different projects, lists all the steps and the tools to be used for each step (a total of 24 tools). Along with practicing the basic fundamentals of using hand tools, students learn about layout, sanding, gluing, assembly, and finishing.

Since this is a new experience for these students, some time must be spent going over the working drawings and plans. For the truck, a laminated, color-coded drawing is posted to assist students in recognizing the various parts of the truck in different views.

The instructor should prepare materials for these projects in advance. We use mostly pine, willow, and basswood for ease in workability. Cut strips of wood to rough width, approximately 1/16" - 1/8" wider than the finished project, with one edge being run through the jointer to provide students with one true working edge. The materials are placed in a barrel and labeled. Precut pegs are purchased and wheels are cut with the band saw from 1-1/4" dowel or closet rod stock. The pegs and wheels are issued to students as they need them.

In assembly, 1.2"-long wire brads with heads cut off are used to hold parts in place while the glue sets. It takes a little time on the instructor's part to cut the heads off the brads but it makes assembly easier for beginners. Two brads, pushed in with pliers, located in each glue area, are all that is needed. □

Bill Klements is an industrial arts instructor, Douglas (Wyoming) Middle School.

DEVELOPING PRODUCTS FOR MANUFACTURE

1. Title

2. Credit

3. Most manufacturing companies face a recurring problem--finding the right product to introduce to the consumer. But what is a new product? There are at least three ways to answer this question.

4. It may be a product never before introduced in the marketplace--an INNOVATION. Innovative products of the 20th century include: the computer, the transistor, the airplane, nylon to name just a few.

5. A new product may be a modified version of a previous product--an ADAPTATION of a product already in the company's line or in that of a competitor. Examples of products which are adaptations of earlier products are the 10-speed bicycle, color television, and the electric can opener.

6. A third type of new product may be new to the company but not new to the market--an IMITATION. We are constantly introduced to imitation products--a new cola, another mini-burger fryer, another version of a toy truck, and the list goes on.

7. As a company develops its new products, two basic approaches may be used--a production approach or a marketing approach.

8. In the production approach the product is developed then a desire to buy the product is created through extensive advertising compaigns, attractive point-of-purchase displays, and other promotional activities.

9. Using the market approach, the company personnel first determine what the consumer wants then an attempt is made to meet the need. The emphasis is on features desired by the customer.

10. However, product designers using either approach must consider three main factors. They must design a product with function, selling, and manufacture in mind.

11. Designing for function involves considering the product's purpose along with its operation and performance. Further consideration must be given to the safe use and maintenance of the product.

12. In designing for selling, a designer must make the product appealing to the customer. The product must be attractive and represent value for the money.

13. Designing for manufacturing requires the designer to consider simplicity in terms of shapes, number of parts, and materials and finishes used. Standard parts should be utilized when it is economical. Tolerances should be as large as permissible.

14. The goal of the designer is to use innovation, adaptation, or imitation to design a product that meets a need or a developed want. This product must be functional, appealing and economical to produce.

15. To accomplish this objective a number of design activities must be completed.

16. The first activity is related to applied research and involves the task of Idea Generation.

17. During this phase, designers are involved in ideation--the task of developing a number of solutions to a need, then selecting the best solution.

18. They first let their imagination soar as they produce a number of rough sketches.

19. This is the first step in a process called "imagineering" where as many answers as possible are created for a design problem then later the ideas are engineered back to reality.

20. The designers let their ideas flow without judging them. Thoughts like "This won't work!" or "That's ugly!" are out of place at this time.

21. These rough sketches become a "library of ideas" from which designs are further developed. The ideas that seem to have possibilities are refined by the designers.

22. Refined sketches are produced for those ideas showing the most promise.

23. These refined sketches show more details than did the earlier rough sketches.

24. The lines of the product begin to take shape--the overall form looks more finished and, in general, the product looks more realistic.

25. Artist's renderings of the refined ideas may be prepared if styling is an important feature of the product.

26. At this stage the refined sketches are further developed and enhanced--styling details are shown and unifying design features are incorporated.

27. The rendering presents the designers best concept of how the product should look. It may be a pictorial view which shows the top, front and side of the product in one illustration--

28. or, it may show just one side to give more detail.

29. The refined sketches and artist's renderings, if needed, are now ready for the second design activity--Idea Approval.

30. The refined idea, or ideas, are submitted for review and analysis. This step may include a product planning or review committee or it may be done by the designer's immediate supervisor.

31. The purpose of this step is to encourage development of promising ideas and stop work on ideas which, for various reasons, fail to be acceptable.

32. Those ideas which are accepted enter the next phase of refinement--Product Development.

33. This activity involves preparing detail sketches. These sketches include dimensions and provide enough information so that models can be built.

34. Specific portions of the product may be illustrated which were not adequately shown on the approved refined sketches.

35. Also, construction techniques may be sketched so that the next step in product development may be started.

36. This step is model making where the ideas recorded in sketch form now take shape in three-dimensional objects. These models may be soft mock-ups, which have no working parts.

37. Mock-ups are often made of easily worked materials like matte board, styrofoam, and balsa wood.

38. The finished mock-up should provide a good representation of the intended appearance of the proposed product.

39. In many cases, full-sized working models are produced after the soft mock-up is approved. These models, called prototypes, allow the designers to actually test the working features of the product.

40. The ease of use, balance, weight and a number of other factors may be tested using the prototype.

41. The developed product is now ready for the fourth phase--Product Design Approval.

42. The product is reviewed from the production, financial, engineering and marketing perspectives. Each product must show a strong profit potential before it receives approval for the next step--

43. which is Product Engineering. This last step in the development of a product specifies all of its characteristics. This information is needed by the production deparment in order to mass produce the product.

44. Engineering drawings are prepared to communicate a number of characteristics.

45. Detail drawings describe the size and shape of single parts.

46. Assembly drawings show the way parts fit together.

47. Schematic drawings show arrangements of electrical, hydraulic, pneumatic, or mechanical systems.

48. Also, special purpose drawings may be used, such as this one, which details finishes to be applied to each part.

49. In addition to drawings, the product design engineers prepare a bill of materials.

50. All the materials needed to produce one product are included on this form. Each part is listed with a description of the material from which it will be made along with its dimensions. The parts usually appear in their order of importance with the larger parts first and the standard purchased parts last.

51. Product engineers may also prepare specification sheets which outline characteristics of basic materials, adhesives, abrasives, finishes, and other information.

52. The specifications for a basic material, such as an adhesive, would include descriptions of its physical and chemical properties.

53. The 1st activity of product engineering is engineering testing.

54. This involves subjecting the prototype to various test to determine if the design will, in fact, meet specified performance and durability standards.

55. Now let's summarize product design. The product designers and engineers use innovation, adaptation, and imitation to design marketable products which can be economically manufactured.

56. Ideas are generated using various sketching techniques including: rough sketches, refined sketches and artist's renderings.

57. These ideas must then receive approval for further development.

58. Product development takes the approved ideas and creates three-dimensional mock-ups and prototypes.

59. The best prototypes are then submitted for approval.

60. The product is engineered by preparing drawings, bills of materials, and specification sheets. Also, the prototypes are subjected to testing procedures to insure that the developed products are actually functional.

61. The products we use daily were developed through this process, or a very similar one. The process goes on continuously and you can be sure that manufacturers are busy at this moment developing many exciting new products for our future use.

62. End

RESEARCH & DEVELOPMENT

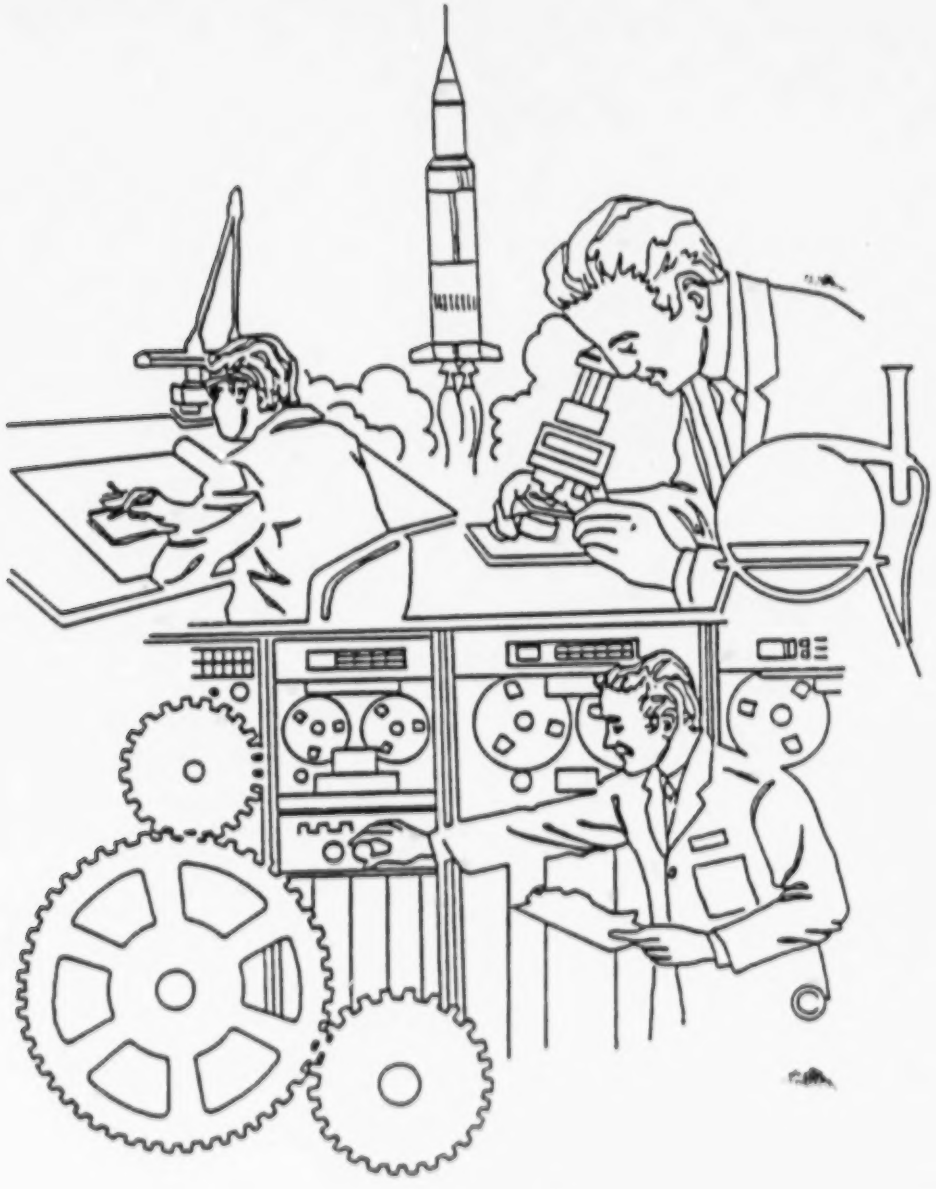
FIRST PLANNING BOARD

Designer's Name: _____ Design Group No: _____

Product Name: _____ Product Category: _____

Statement of Problem:

Approximate Cost: (List items and cost for each)



MF-P-014
Introduction to Assembly
Ray Shackelford

INTRODUCTION TO ASSEMBLY

Technical System: Manufacturing (Materials and Processes)

Introduction:

Manufacturing processes are used to convert engineering materials into industrial and consumer products. These processes, often referred to as secondary operations, produce parts, subassemblies, or final assemblies (products). These secondary operations are often grouped into six classifications or categories of industrial processes. These include casting and molding, separating, forming, conditioning, assembling, and finishing.

Assembly processes are used to semi- or permanently join (assemble) two or more materials or parts together. There are four basic techniques used to assemble materials. They are (1) mixing, (2) weaving, (3) magnetic fields, and (4) joining. Joining, the most common form of assembly, utilizes three basic principles of assembly. These principles include: adhesion, cohesion, and mechanical.

This Technology Education Activity is designed to introduce and reinforce the understanding of assembly processes; and the study and use of several identified methods of joining materials. The product selected for this purpose is a key holder. The product and the material conversion processes to be reinforced through its manufacture are shown in Figure 1.

Technology Education Activities MF-P-005, MF-P-014, MF-P-029, and MF-P-030 are related in that they provide parts for the same product (a Key Holder).

Concepts Presented: Adhesion Assembly
Cohesion Assembly (inertia welding)
Mechanical Assembly (nailing and screwing)

Objectives: After completing this Technology Education Activity, students will be able to:

- Manufacture a key holder within specified specifications and tolerances.
- Identify and describe the manufacturing processes and materials used to produce the key holder.
- Identify and describe the critical design elements and processing principles included in the key holder.

Equipment/Supplies:

- 1/4" round acrylic dowel rod
- 1/4" acrylic
- Walnut or other appropriate wood
- Selected abrasives
- Drill Press
- Band Saw
- Screw driver
- Layout tools
- Router
- Picture hanger (TEA MF-P-005)
- Appropraite fastners
- Introduction to Assembly Observation Sheet

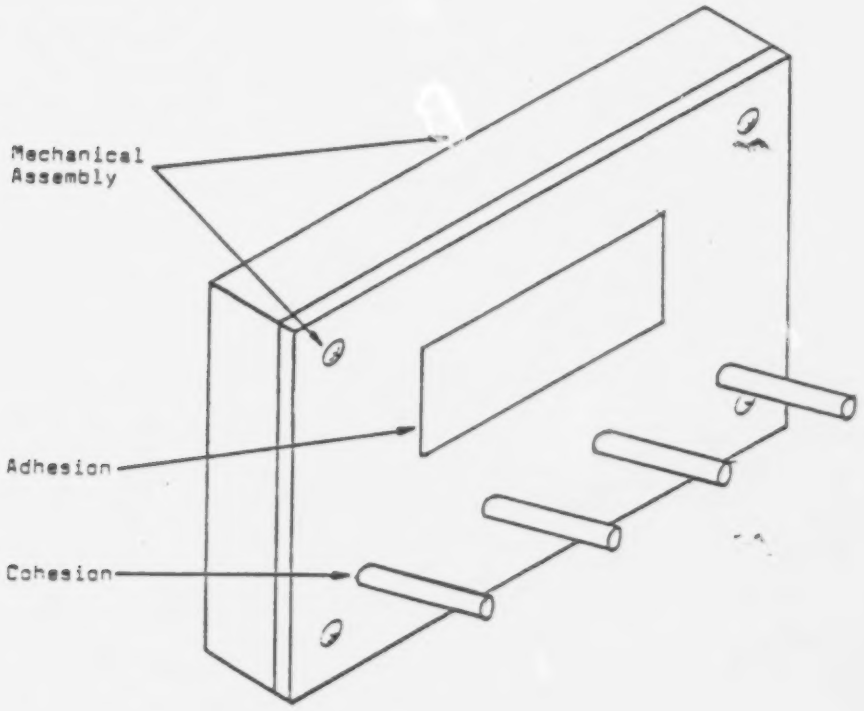


Figure 1 - Concepts to be Reinforced

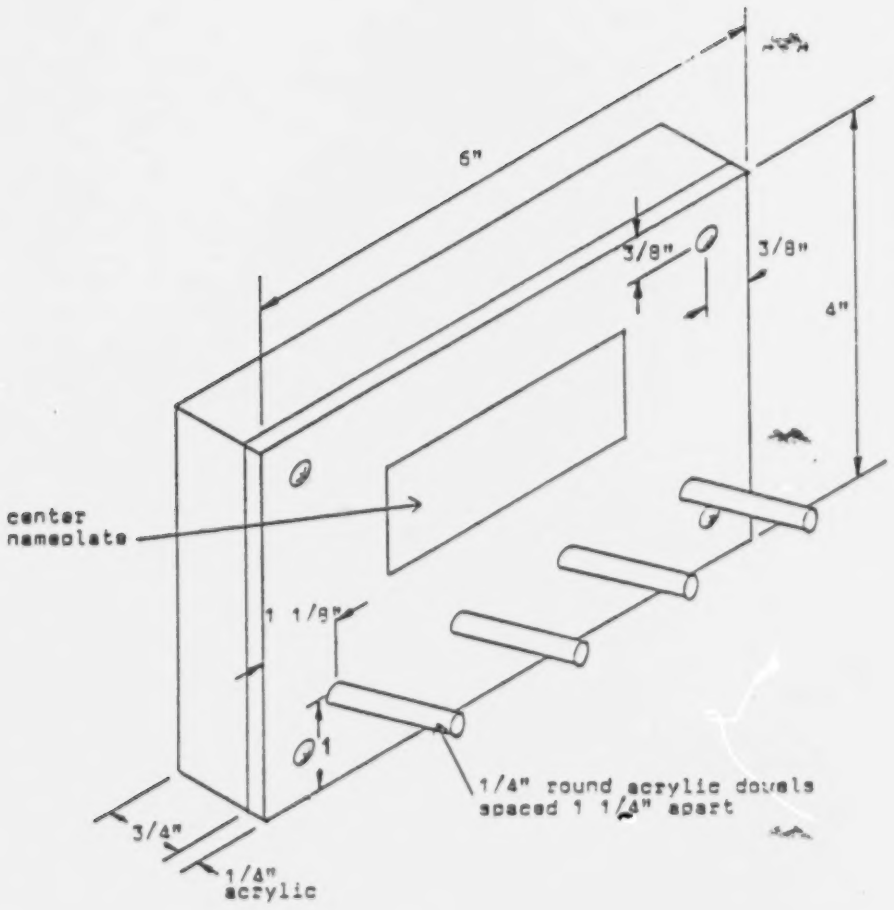
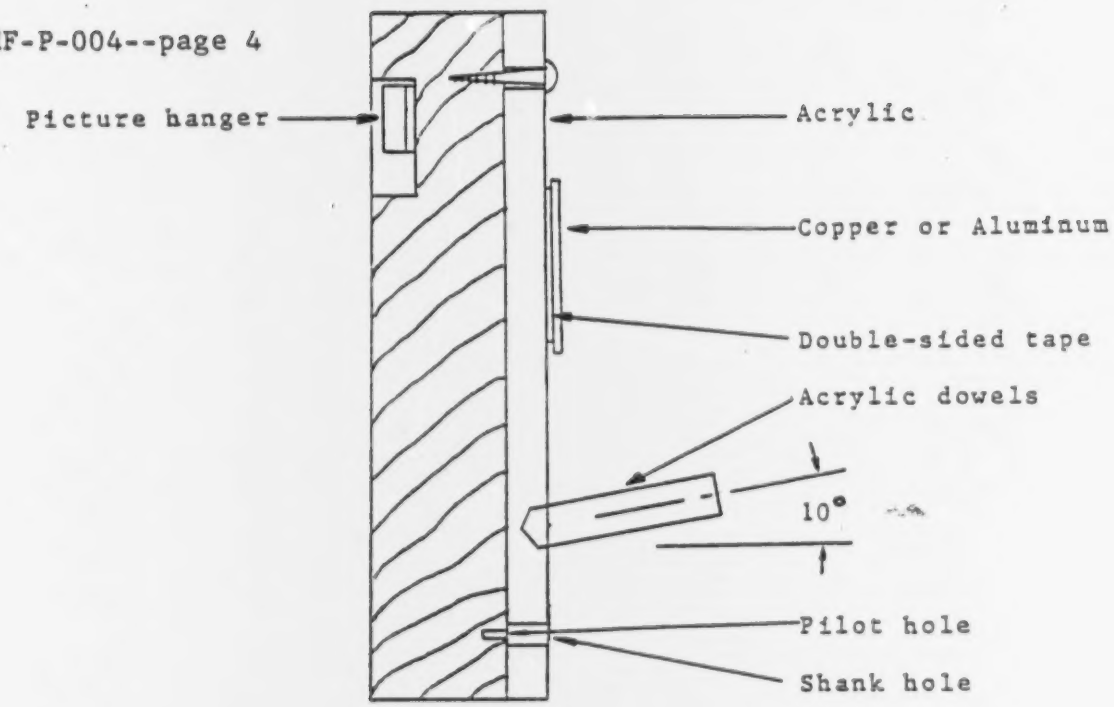


Figure 2 - KEY HOLDER

BILL OF MATERIALS

PART	QUAN	MATERIAL	SIZE
1	1	Hardwood	3/4" X 4" X 6"
2	1	Plexiglass	1/4" X 4" X 6"
3	4	Round Head Wood Screws	#4 X 3/4"
4	4	Acrylic Dowels	1/4"D X 1 1/8"
5	1	Picture Hanger	
6	2	Wire Brads	
7	1	Double Backed Tape	sized to fit "KEYS" name plate
8	1	Name Plate	18-22 gauge X 1" X 3"



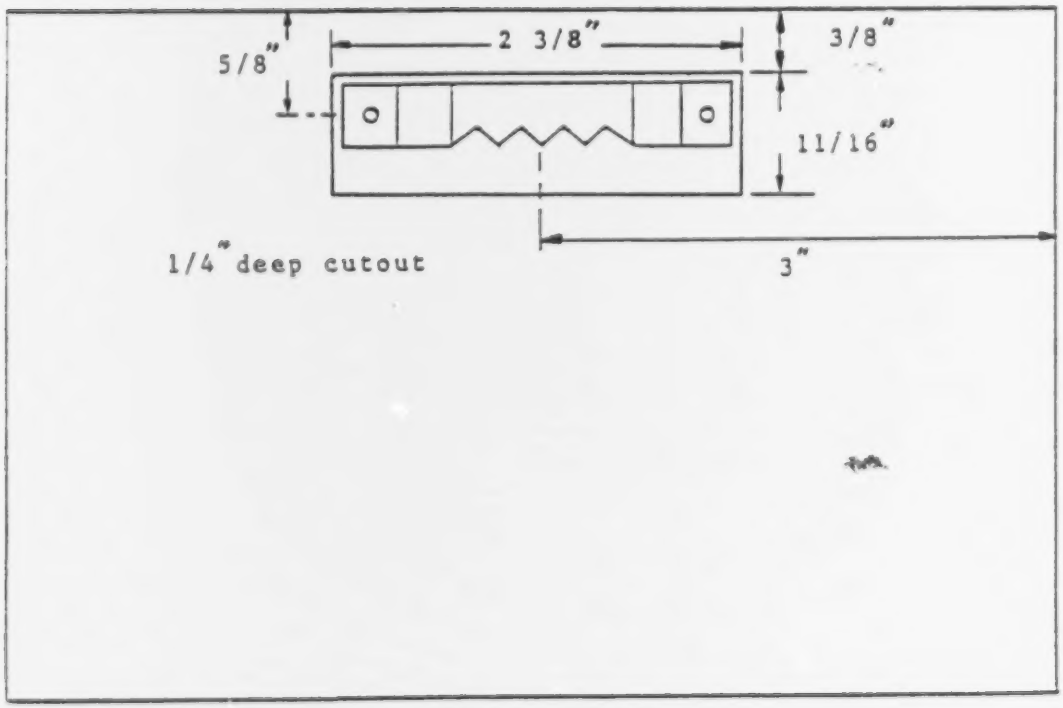


Figure 3 - Assembly Drawing

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Procedures:

Caution: Read all procedures carefully and practice the activity before introducing it to your students. Then have the students:

1) Obtain the materials for the key holder. See Bill of Materials and Figure 2.

2) Separate (cut) the wood, acrylic sheet, and rod to required thickness, width, and/or length. (Note: Keep the protective covering on the acrylic material until the interia welding process.)

3) Locate and drill the pilot holes for the #4 round head wood screws 1/2" into the base.

4) Locate and machine (router, chisle, etc.) the recess for the picture hanger according the identified specifications.

5) Abrade the edges and surfaces of the wood block base to the desired surface finish.

6) Abrade the edges of the acrylic sheet to the desired surface finish. (Note: Remember the wood base and the acrylic sheet should be the same size and have the same locations for the wood screw mechanical fasteners.)

7) Abrade both ends of the acrylic rod and place a very slight (1/32" R) on booth ends.

8) Locate and drill the shank holes for the #4 round head wood screws through the acrylic sheet.

9) Tilt the table the drill press 10 degrees. Locate and mark the acrylic dowel locations. Countersink the locations of the acrylic dowels using a 15/64" drill bit to a depth equal to but not to exceed the heigth of the drill bits shoulder.

10) Next remove the protective covering on the acrylic sheet from the side with the countersinks only.

11) With the assistance of another indiviual proceed with the assembly of the acrylic dowels and sheet using a cohesion interia welding process using following steps:
    a. tilt the table of the drill press 10 degrees,
    b. locate and secure the acrylic sheet running lengthwise and perpendicular to the tilt of the drill press table and directly under the center of the drill press chuck, see Figure 4,

c. locate and tighten the 1/4" dowel into the drill press chuck being carefull to tighten it sufficiently enough not to let it spin in the chuck durng interia welding, but not tight enough to crack or mar the rod,
d. set the drill press for the fastest RPM possible,
e. turn on the drill press and slowly bring the quill of the drill press down until the dowel makes contact with the countersunk hole in the acrylic sheet,
f. press slightly and as soon as the acrylic is observed to melt have the assistant turn the drill press off while the operator maintains a constant pressure between the two parts until the weld area has cooled, and
g. loosen the chuck from the acrylic dowel.

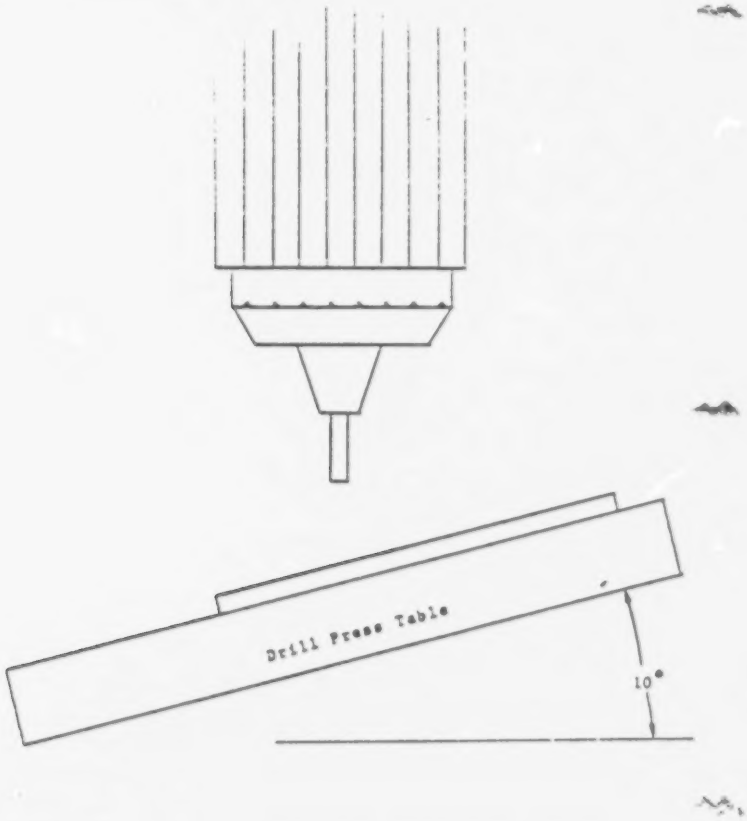

Figure 4 - Inertia Welding Setup

12) Repeat step "11" for the assembly of each dowel to the acrylic sheet.

13) Locate and assemble the "KEYS" name plate to the acrylic sheet, according to specifications, using an equal size piece of double backed tape (assembly by adhesion). 180

14) Using a natural pentrating oil or similiar finish seal the surfaces of the wood base.

15) Next locate and assemble the picture hanger according to specifications, in the recessed groove on the back using small wire brads (mechanical assembly).

16) As the final secondary process assemble the wood base sub-assebly to the acrylic sheet sub-assebly using the round head wood screws (mechanical assembly).

17) Upon completing the Key Holder have each student or students working in groups of two analyze and describe the assembly processes used in the production of the Key Holder by completing the Introduction to Assembly Observation Sheet.

Related Concepts: Separation
Finishing
Conditioning

Companion Technology Education Activities:

MF-P-005 Mated Die Forming
MF-P-029 Chemical Machining
MF-P-020 Abrasive Machining

INTRODUCTION TO ASSEMBLY
OBSERVATION SHEET

Names _____ Date _____

_____ Class _____

ASSEMBLY PRINCIPLE

PROCEDURE	ADHESION	COHESION	MECHANICAL
ie. nailing			

Instructions: List the assembly processes used to manufacture the key holder and then describe the process performed in the appropriate corresponding location.

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Video Production

BY: Gary Bolyard
John Lucento
Tom Morris (Student Assistant)
Tom Scott (Student Assistant)

SYSTEM: Communications

UNIT TITLE: Telecommunications Systems

SUGGESTED TEACHING TIME: 7-14 Days

ACTIVITY DESCRIPTION: The students will produce a 1/2 - 1 minute television commerical using videotape equipment. Each student will write a storyboard card for some product or service. The class will be divided into groups of 6 students (minimum) to 12 students (maximum). Each student will have a specific duty during the planning and taping of the commerical. Each group must have at least one dress rehearsal before final taping.

GENERAL LEARNING OUTCOMES: GT-1, GT-2, GT-4, GT-5

SYSTEM LEARNING OUTCOMES: CM-1, CM-7, CM-10, CM-11

SYSTEM ENABLING OBJECTIVES: 1, 2, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71

TARGET* Activities
*Teaching Activities and Resource Guide for Educators of Technology
West Virginia Department of Education
1987

TOOLS/EQUIPMENT/MATERIALS:

1. One video cassette recorder, camera, monitor, and 35mm video camera tripod (with dolly).
2. A blank video cassette.
3. A model or actual product to be advertised.
4. Colored markers, posterboard and various art supplies.
5. A cloth backdrop or suitable background.
6. Selected material for props and sets.
7. Stop Watch

SPECIAL RESOURCES/SUPPLIERS:

Lee Hartman & Sons, Inc., 3236 Cove Road, N.W. P.O., Box 13365, Roanoke, Virginia, 24033 (703-366-3493) (Wholesale Distributor for Audio Visual-Sound Systems and Components-Video).

TIME IN DAYS	TEACHER	STUDENT
2-3	Lecture: Background material discussing the television components, history and transmission of signals. Introduce video camera and demonstrate its use. Describe activity, using 3 page student handout. (at end of this TEA)	Take notes and question and answer sessions. Learn how to operate: camera, VCR, Etc..
1-2	Describes storyboarding activity, make group duty assignments, and set due dates.	Design storyboard and choose groups and select duties.
3-7	Assist students in production of video. Check on progress each day with: Director, Tech. Ass't, etc..	Decide on one storyboard per group. Make props, sets, cue cards, sets and tape the commerical. Individual Assignments: (Work to be completed before shooting video) Director- Responsible for planning & writing script, storyboarding, and designing visuals for the production. Will

TIME IN DAYS	TEACHER	STUDENT
		furnish typed script to: Stars, Tech. Ass't. and Instructor Technical Assistant-Works with Director as needed. Technician-Practice using the video recorder and monitor. Camera Operator-Practice operating the camera, Learn different shots. Star or Stars-Learn their parts in the commerical Assist with costume design Set Designer-Plans each scene of the commercial. Stage Hands-Will make and/ or set up all props, background material, costumes. *Some duties may have to be combined-depending on group size).
	Observe assist in rehearsal.	Conduct final rehearsal taping of video production.
1	Assist students with final taping of video production.	Students will assume the following duties: Director: has total control of the production. Responsible for planning and writing script, storyboarding, and designing visuals for the production. Must furnish typewritten script to star, technical assistant, and instructor. Must turn in rehearsal tape and furnished tape. Technical Assistant: Assists the director in any capacity needed. Should print the cue cards from storyboard or script. Will set up all equipment for the production and works directly with director during actual shooting.

TIME IN DAYS	TEACHER	STUDENT
		Technician: Operates the video-tape recorder and monitor. Responsible for control of the tape and footage numbers for finding the taping. Camera Operator: Must operate the camera during all rehearsals and final production. Following the directions of the director. Stars: Serves as the talent for the production. Must supply own costume under the direction of the director. Will be responsible for reading script from cue cards. Stage Hands: Move props, hold cue cards, handle costumes, change scenes, and any other duties as needed by the director and technical assistant.
1	Review and evaluate final video productions.	Watch videos and make suggestions for improvements.

BACKGROUND INFORMATION:

The Television Picture:
The television camera converts visual images into electrical current. This is done in most TV Cameras by the **Vidicon Tube**. After the light enters into the lens of the camera it passes into the Vidicon Tube. The tube consists of a **faceplate**, and inside coating layer called the **signal plate**, and another plate which is called the **target**. These three plates are located in sequence. The target is made of a photosensitive material that conducts electricity when exposed to light. An **electron gun** (which is located behind the target) scans the target and picks up the image in the form of **electrons**. Positively charged areas are left on the back surface of the target. The brightness of the light

BACKGROUND INFORMATION (Continued)

entering the vidicon tube causes the image to have lighter or darker variations within the image that is being projected. The electron gun scans the entire target 30 times each second. As the electron gun scans the target the lighter and darker images are picked up in the form of positively charged areas from the target. The current created from the signal plate and the target is called the **videosignal.**

The vidicon tube changes the reflected light and positively charged areas on the target. These are picked up by the scanning of the electron gun.

In color cameras three vidicon tubes are used. The three tubes filter out and send one color each of the red, blue, and green colors. This is merged in the TV set (the receiver) into a color picture.

The Television Sound:
Microphones in the television studio pick up the sound of the program. The microphone contains a highly sensitive diaphragm. When the sound waves strike the diaphragm, vibrations result. The vibrations are converted by the microphone's electrical device into an audio signal.

Television Program Transmission:
The video and audio signals are combined by the transmitter into a television signal. The transmitter amplifies, and broadcasts the signal thru the antenna.

Television signals cannot travel farther than 60-70 miles because of the curvature of the earth and large objects such as mountains. For this reason there are relay stations that amplify or strengthen the signal and sent it on to the next relay station. The relay stations are located on top of hills or mountains. Satellite relay stations in space are used to transmit television signals along with the land stations.

Reception of Television Signals:
Television sets are designed to receive signals and convert them into sound and pictures. A television set consists of a tuner, an amplifier, an antenna, a separator, a speaker and a cathode-ray tube.

An antenna receives the signals and sends them to the tuner. The tuner signals out the television signals. The signal is then sent to an amplifier and a separator. THe amplifier strengthens the signal and the separator divides the signal into audio and visual signals. The audio signal is sent to the speaker and converts the signal into sound. The video signal is sent to the cathode-ray tube and is converted into a picture.

BACKGROUND INFORMATION (Contunued)

History of Video Tape Recording:
An early forerunner of tape-recording was Poulsen's "telegraphone" (1898) for the recording of telegraphic messages and, later on, of speech on thin steel wire as the magnetic storage medium. A subsequent development was the "magnetophone", a device developed by the German electrical-engineering firm of AEG in 1930. It used iron oxide powder as the storage material applied to a base consisting of a paper or plastic tape. In 1953 the Radio Corporation of America (RCA) developed Olson's video tape recorder, operating with a tape speed of 6 m second longitudinal recording with a fixed recording or reproducing head. Because of the very high tape speed, this apparatus was not very suitable for practical purposes. In the Ampex machine developed by Ginsburg in 1956 the signals are recorded transversely, the tape speed being 38 cm sec.. This apparatus had four recording heads (and four reproducing heads) positioned at intervals of 90 degrees around a rotating disc. It was the first really serviceable video tape recorder for commerical use, giving a picture of such good quality that a prerecorded television transmission was no longer distinguishable from a "live" one. In 1959 the Japanese firm of Toshiba introduced a recorder with a tape speed of 19 cm sec. and oblique recording on a helically guided tape by means of a single rotating head.

The Videocassette Recorder (VCR) is a device used to record television broadcasts. The VCR will record both audio sounds and video images. The magnetic signals are recorded on a magnetic tape which is similar to the ones used in audio tape recorders. There are two basic formats for VCR's: VHS and BETA. They are not interchangeable, but are usually equal in quality.
A video cassette player turns the magnetic pulses recorded on the tape back into electronic signals. These signals are converted into pictures and sound again in the TV set, similar to the way broadcast TV works.
By using a VCR, a person may watch a program later or even watch prerecorded tapes which can be purchased or rented.

Videotape Recording is the technique of storing video signals by means of a tape magnetized along its length in accordance with the signals impressed upon it. The video tape, which is made of a plastic material coated with magnetic oxide, is routed past a recording head, and the signals are stored in the magnetized oxide particles.

Moving Pictures are recorded on video as still pictures, referred to as frames, one at a time. They are played back very fast (30 frames per second in the USA) to give the effect of a moving image. The VCR has the ability to "Freeze" a single frame in order to show a still picture. It is also possible to change tape speeds for slow or fast motion.

Another form of recording audio and video information is on the Videodisk, which looks similar to a long-playing record. There are two main types of videodisk systems: Mechanical and optical systems.

Careers in TV Broadcasting:

-Announcers
-Newcasters
-Directors
- Broadcast Technicians
- Camera Operators
- Actor / Actresses

VIDEO PRODUCTION;

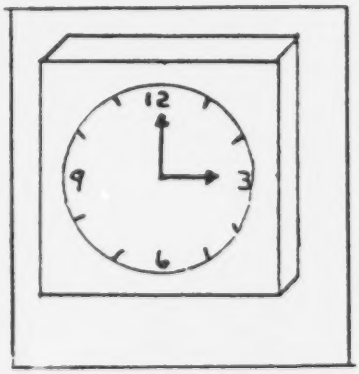
Storyboard:

A storyboard is a television script that includes drawings to help explain the video information in a commercial or television program. A storyboard outlines the commercial with pictures and written descriptions.

Each frame of the storyboard illustrates an important scene of the commercial. The illustrations should be drawn by hand with as much detail as possible. The video and audio information should be written below each picture. The video information should be written in all capital letters. The audio information should be written in both capital and lower case letters.

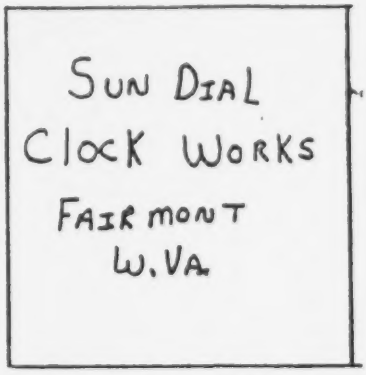
Where can I hang my new walnut clock?

MEDIUM SHOT--
TIME: 5 sec.



These clocks are made with finest quality walnut and the clock works are backed 100%.

CLOSE-UP--
TIME: 15 sec.



To order, write
Sun Dial Clock Works
Fairmont, WV 26554

CLOSE-UP--
TIME: 5 sec.

Script
The script is completed from the storyboard cards. It should be written on a standard 8 1/2" x 11" sheet of paper. Fold paper vertically in half. On the left side of the paper, write the information about the scene. On the right side of the paper write the actual words that are to be spoken. All members of the group should have a copy of the final script.

Close-up (CU) - A camera shot that focuses on a subject and generally does not include much background.

Medium shot (MS) - A camera shot that includes an entire subject with some background.

Full shot (FS) - A camera shot that shows one or more subjects completely. A full shot includes a good deal of the surrounding scene.

Angle shot (AS) - A camera shot taken from any position except straight on.

Pan - Camera movement from left to right or right or left along a straight horizontal line.

Tilt - Camera movement up or down along a straight line.

Zoom - Camera movement towards or away from a subject. The subject remains in focus during the movement.

Television Terms:

Microphone - A microphone is a device that converts sound (acoustical energy) into electrical energy. When the sound waves strike the microphone, it causes a diaphragm (a thin membrane) or a thin ribbon of metal to vibrate. The vibrating action causes a change in the electrostatic field that passes through the microphone. The electronic signal can then be easily sent to its destination by wire.

TV Receiver/CRT - A television receiver or CRT (cathode ray tube) is a decoding device that converts electrical signals into a visual image. The electrical signal causes a beam of electrons to be emitted that flow toward the positively charged face of the CRT. The strength of the electrical signal controls how many electrons hit the surface and how hard they strike. When the electrons hit, they strike the Phosphorescent material that is coated on the inside surface of the screen. These dots glow and blend together to reproduce the original image. A synchronizing signal aligns each bit of information of the screen to reconstruct the image as our eyes see it.

TV Camera - A televison camera is a device that converts a visual signal into an electrical signal. When light from the original image is reflected. It is picked up by the camera lens and focused on the vidicon (camera pick-up) tube. The surface of the tube is light sensitive and causes a change in an electrical signal depending upon how bright the image is at any particular point. The camera adds a sync (synchronizing) signal so that when the message is decoded, it can be reconstructed properly.

Production Sequence:
Form the groups (6-12 students)
Decide individual duties
Decide on product to be advertised
Complete storyboarding
Make script from storyborad
Print cue cards, make props, complete background
Practice rehearsals
Videotape rehearsals

REFERENCES:

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The Illustrated Encyclopedia of Technology, (1984), New York, New York: Exeter Books, ISBN #0-671-07040-1.

The Way Things Work, Vol.II, (1971) New York, New York, Simon and Schuster ISBN #0-671-21086-6.

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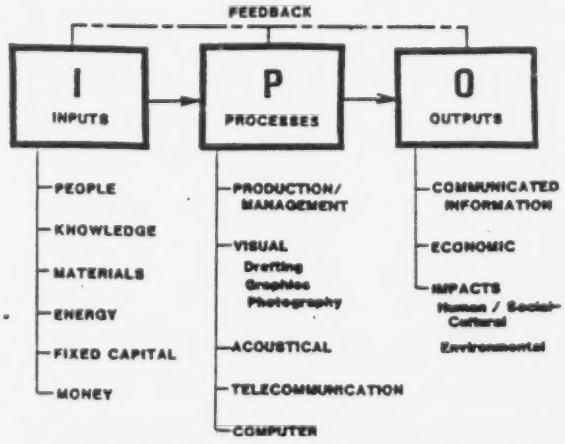
THE COMMUNICATION SYSTEM



**NOTE: This ON TARGET activity packet relates specifically to the TELECOMMUNICATION PROCESS AREA of the communication system.

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THE VIDEO PRODUCTION PROJECT (STUDENT HANDOUT)

What it's all about

Every student in the class must create and write storyboard cards for some imaginary product, service or event. The storyboard cards should be written and prepared with the guidelines and limitations in mind. You only have a certain space in the classroom to shoot your video, a limited number of people to help put on the production, a minimum time frame in which to tape the commerical, and the commerical, and only certain capabilities with the equipment in which it will be produced. After the cards are written, submit them to your instructor for evaluation. The due date for the storyboard cards is _____.

When the storyboard cards are returned, get together with your group members and decide which group member's cards will be used for the video production. The group must decide on one commercial. If no one agrees on which one to use, or none of them seem very good, the entire group will need to write a new commerical. Once the idea is decided upon, the group needs to determine what roles and tasks each member will be responsible for. The group members should also exchange names and phone numbers, if this has not already been done. Before your actual production date, the group may want to choose a time in which all can meet for rehearsal. A rehearsal before the day of production is mandatory!

Production dates for each group will be determined by random during lab. Record your production date here: _____.

Requirements

The video production must:

-- have a job for every group member (This information is submitted with the storyboard cards giving the job title and name of person who will have the responsibility. Utilize titles discussed in class.)

-- fade up from black to job chart for approximately 10 seconds then fade back to black for 3 seconds. Then fade up to first scene of the commerical. (Commerical must end by fading to black at end, and the cutting.)

-- be original. Do not copy from existing TV commericals or other student productions.

-- work within the guidelines and limitations set in class.

-- be a minimum of 30 seconds (excluding job chart time) and a maximum of 1 minute. (Note: must be **either** 30 or 60 seconds).

-- advertise a product, service or event that is original or unique. It must be something that can be aired on regular TV today, therefore, excluding illegal products, services or events, and smoking materials.

What Else?

Other guidelines will be discussed in class. Grading criteria will also be introduced during the lab lecture on video/storyboarding.

Group #_____

COMMUNICATION SYSTEMS

Laboratory Directions for Video-Tape Production

1. Identify group members: Director's Name _____

   Technical Assistant_____

   Technician (Recorder)_____

   Camera Operator_____

   Stars_____

   Stage Hands_____

2. Produce storyboard and cue cards (one set each)

3. Produce visuals (minimum of two different visuals, e.g., props and background)

4. Tape one rehearsal (to be submitted)

5. Tape final production (length: 30 seconds to 1 minute)

Dutes:

Director:
Has total control of the production. Responsible for planning and writing script, storyboarding, and designing visuals for the production. Must furnish typewritten script to star, technical assistant, and instructor. Must turn in rehearsal tape and finished tape.

Technical Assistant:
Assists the Director in any capacity needed. Should print the cue cards from storyboard or script. Will set up all equipment for the production and works directly with director during actual shooting.

Technician:
Operates the video-tape recorder and monitor. Responsible for control of the tape and footage numbers for finding the taping.

Camera Operator:
Must operate the camera during all rehearsals and final production. Following the directions of the director.

Stars:
Serves as the talent for the production. Must supply own costume under the direction of the director. Will be responsible for reading script from cue cards.

Stage Hands:
Move props, hold cue cards, handle costumes, change scenes, and other duties as needed by the Director and Technical Assistant.

VIDEO TAPE PROJECT

The following areas should be considered in the critiquing of the broadcasts. A possible 10 points can be given in each area, therefore, enabling a student to receive a possible 100 points. Write comments for each score you put down.

Category Comments Points

Script _____

_____

Format _____

_____

Originality _____

_____

Content _____

_____

Time _____

_____

Sound _____

_____

Props & Costume _____

_____

Special Effects _____

_____

Camera Movement _____

_____

Set Design _____

_____

TARGET TRAINERS INFORMATION SHEET: VIDEO PRODUCTION ACTIVITY

VIDEO TAPE PRODUCTION 75 min.

15 min. lecture (Background information & how to do a video production)

50 min. make a 30 second commerical to sell a product.

10 min. review videotaped commericals

MATERIALS:

1-2 video cameras, recorder/tripod (with dolly)

VCR and monitor (playback)

3 blank video cassettes

1 pre-recorded 60 second commerical (FSC)

6 color markers

Stop watch

Legal pad and 6 pieces of posterboard

2" masking tape

1 roll 36" wide white paper (backdrop) or cloth curtain for backdrop

BREAKDOWN FOR SESSION

minimum of 6 people, maximum of 12 (1 camera for each group) (suggest each group have a seperate room to work in)

SUGGESTED BREAKDOWN FOR 12 PEOPLE:

*director	storyboarding
*tech. assistant	script writing
*technican	cue cards
*camera man	
*stars (min. 2)	set designers (3): -stage hands -set up props -make costumes -background

*Suggested breakdown for 6 people.

APPENDIX

D

PHONE: 746-1400

Chartiers - Houston School District

OFFICE OF THE SUPERINTENDENT

2080 WEST PIKE STREET
HOUSTON, PENNSYLVANIA 15342

DOROTHY DILLEMUTH
SUPERINTENDENT

TIMOTHY E. VAIL
BUSINESS MANAGER

BOARD OF EDUCATION
HARLAN SHOBER, PRESIDENT
ANTHONY MARRA, VICE PRESIDENT
NANCY A. RIDDER, SECRETARY
IRENE H. SIMS, TREASURER
ANTHONY DIXON
ALEXANDER GUMP
RICHARD HALL
JENNIFER JILLSON
SARAH PORCARO

February 8, 1988

Dr. John Wright, Associate Dean
College of Science and Technology
California University of Pennsylvania
California, PA 15419

Dear Dr. Wright:

The Chartiers-Houston School District was most fortunate to be part of the Project Tech Program for this year. We have benefited greatly by the assistance of Dr. McCory and Dr. Pecosh as well as by the on-site consultants. Our Technology teacher has demonstrated great enthusiasm for the evolving program. Upon completion of the new Technology rooms, our teachers will have a facility to further enhance their new Technology curriculum.

We sincerely hope that you will be able to secure the funding necessary to continue the Project Tech Program. We need it to complete our renewal effort.

Sincerely,

Dorothy Dillemuth

Dorothy Dillemuth
Superintendent

BEST COPY AVAILABLE

"BIG MAC"

Canon-McMillan School District

PHONE: 412-746-2940

OFFICE OF THE SUPERINTENDENT
1 NORTH JEFFERSON AVENUE
CANONSBURG, PENNSYLVANIA 15317

February 12, 1988

DR. DONALD STRANG
SUPERINTENDENT

DR. JAMES S. JOHNSTON
ASSISTANT SUPERINTENDENT

LOUIS J. POPIOLKOWSKI
ADMINISTRATIVE ASSISTANT

JOHN G. FRANJIONE
SECRETARY
BOARD OF SCHOOL DIRECTORS

To Whom It May Concern:

As the school district's supervisor of the project to transform our traditional industrial arts program to Technology Education, I urge you to continue this extremely important program of assistance. Quite simply, without the expertise and the resources provided by the universities, we shall be unable to continue.

The consultant who has been working with our teachers has done an outstanding job of developing activities, writing curriculum and changing the attitudes of teachers. We now have excited teachers and a seventh grade Technology Education curriculum. We need to develop courses of study for grades eight through twelve if we are to successfully implement a thoroughly articulated Technology Education curriculum, grades seven through twelve.

Sincerely,

CANON-McMILLAN SCHOOL DISTRICT

James S. Johnston
Assistant Superintendent

JSJ/ng

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We are an equal rights and opportunity school district.

February 5, 1988

To Whom It May Concern:

As a Canon-McMillan teacher directly involved with the development of the Technology Education Program I feel that this is a very important and necessary move in the educational program for our students.

Technology is changing, the world is changing, and education must change to keep pace with todays and tomorrows advancements. These changes in our program will enable our schools to educate our students for the technical world they will enter upon completion of their schooling.

The Technology Education Program will promote a technological awareness in students through studies and activities in technological systems. This program must be continued throughout our secondary schools for the benefit of our students in making them aware of present and future technology and offering guidance into the world of Technology.

James Zanardelli

James Zanardelli

"BIG MAC"

Canon-McMillan School District

CANON-McMILLAN JUNIOR HIGH SCHOOL

AT CANONSBURG

25 EAST COLLEGE STREET

CANONSBURG, PENNSYLVANIA 15317

Phone: 745 - 9030

Principal - JOSEPH T. OSINSKI
Vice principal - DR. WILLIAM RENKO

February 4, 1988

To Whom It May Concern:

I'm writing this letter to express my feelings toward the joint program with the University of California and the University of West Virginia for Technology Education curriculum development.

As a classroom teacher changing from traditional Industrial Arts to Technology Education, the support and direction given by the graduate student assigned to this project has been very valuable. As we put together our program and long-range plan for the district, we are able to get the support and philosophy from two universities to make our document reflect the trends in Technology Education.

At present our concentration has been to develop a program beginning at the junior high level. Therefore, I strongly recommend the program be refunded to enable us to complete the junior high and then move our efforts to develop and change our senior high program.

John Jones

JJ:mlh

"BIG MAC"

Canon-McMillan School District

CANON-McMILLAN JUNIOR HIGH SCHOOL

AT CANONSBURG

25 EAST COLLEGE STREET

CANONSBURG, PENNSYLVANIA 15317

Phone: 745 - 9030

Principal - JOSEPH T. OSINSKI
Vice principal - DR. WILLIAM RENKO

February 4, 1988

To Whom It May Concern:

I feel that the rapidly changing demands of technology require a revision of the role, and consequently the curriculum of industrial arts in American education. This can only be accomplished by an organized program in secondary schools. I feel it is critical to have such a program begin in the junior high school, so I strongly recommend that efforts continue to develop a strong Industrial Arts/ Technology curriculum in the Canon-McMillan School System.

Sincerely,

Joseph T. Osinski

JTO/sh

BEST COPY AVAILABLE

CANON McMILLAN SCHOOL DISTRICT
CECIL JUNIOR HIGH SCHOOL
EDWARD J. KOMAN, PRINCIPAL
R.D. No. 3
McDONALD, PENNSYLVANIA 15057

February 2, 1988

Dr. Wright
California University of PA

Dear Dr. Wright:

The technology program for seventh graders at the Canon-McMillan Jr. High at Cecil, has been very successful during this school year. Not only does this curriculum give us a new direction in which to follow, it provides students with current data and skills in the areas of production, transportation and communications.

The program has also stimulated the enthusiasm of our teacher, Mr. Zanardelli. He accepts the challenge with renewed vigor, thoroughly plans the activities, and keeps abreast of the latest technological information.

I would like to see it integrated into the eighth and ninth grade curriculum.

Sincerely,

Edward J. Koman

Edward J. Koman
Principal

EJK/njb

BETHEL PARK SCHOOL DISTRICT

301 CHURCH ROAD
BETHEL PARK, PENNSYLVANIA 15102-1696
TELEPHONE: 833-5000

April 13, 1988

Dr. John Wright, Associate Dean
College of Science and Technology
California University of Pennsylvania
California, PA 15419

Dear Dr. Wright:

The purpose of this letter is to express the interest of the Bethel Park School District in becoming a participant in the Project Tech Program. We have done extensive research on the topic and are convinced that technology education is of definite value and the trend for the future. Our industrial arts teachers have expressed a strong desire to pursue this educational approach.

We are prepared to make a commitment, both in dollars and time, to insure that a Project Tech Program would be successful in our district. With the expertise of California University and our commitment, we feel that the students of Bethel Park would benefit greatly. We also hope that Project Tech will provide us with the assistance we need to expand our Chapter 6 Vocational Education offerings.

Should you obtain the funding necessary to continue the Project Tech Program, we would like to join you in this worthwhile endeavor.

Sincerely,

Robert B. MacNaughton
Superintendent

RBM/jhm

BETHEL PARK SCHOOL DISTRICT

301 CHURCH ROAD
BETHEL PARK, PENNSYLVANIA 15102-1696
TELEPHONE: 833-5000

April 13, 1988

Dr. John Wright, Associate Dean
College of Science and Technology
California University of Pennsylvania
California, PA 15419

Dear Dr. Wright:

This letter is designed to express my feelings toward my district's efforts to become part of the Project Tech Program which has been run by California University and the University of West Virginia for the purpose of technology education development.

As the chairperson of the Industrial Technology program and a classroom teacher in the Bethel Park School District, I view the Project Tech Program as an effort to bring my department into the twenty-first century. Students today face tremendous pressures in obtaining those skills and understandings necessary to compete in an ever increasing technological world. My teachers join me in this concern and we view Project Tech as a major step toward helping us meet these needs.

The industrial technology staff is eager to join you in this program. We view it as a way by which we can bring vocational education, in a more meaningful way, to a broader range of students.

Sincerely,

John Straub
Chairperson, Industrial
Technology Department

JRS/jhm

APPENDIX

E

PROJECT TECH / PROJECT OPEN

1987-1988 CHARTIERS-HOUSTON

PROGRESS SUMMARY

The transition from industrial arts to technology education in the Chartiers-Houston School District was facilitated by an alliance with California University of Pennsylvania and West Virginia University during the 1987-1988 school year. Preliminary preparation for this change was initiated by the school district during the 1986-1987 school year when it enabled its industrial arts teachers, Mr. Joseph Ciferno and Mr. William Kotyk, to participate in Technology Education Teacher Enhancement inservice workshops in cooperation with California University of Pennsylvania. These inservice programs acquainted the Chartiers-Houston educators with the international evolution of technology education as a reflection of our technological world and its value in the education of youth. Mr. Ciferno and Mr. Kotyk were introduced to the theory of technology education and participated in practical applications of this theory for classroom implementation.

The insight of the Chartiers-Houston School District to the improvement of their Industrial Arts Program and their commitment to this change process was also reflected in their renovation of their existing industrial arts facilities. As part of an extensive building program undertaken by the school district in 1987, the existing shops were dismantled and construction of a Technology Education laboratory was undertaken. This presented a unique situation to the Chartiers-Houston technology education teachers and the curriculum cousultants from Project Tech. The transition from industrial arts to technology education took place in a classroom environment; no laboratory facilities were available at Chartiers-Houston during the 1987-1988 school year.

The first two nine week grading periods at Chartiers-Houston were a time of significant curriculum restructuring under the direction of Ms. Colleen Hill, curriculum consultant from Project Tech. This transitional period included the development of activities which could be implemented within a classroom environment, involved hands-on learning activities, maintained student interest and presented technology education concepts. A sampling of these instructional units include : video productions, structural materials testing, model rocketry and transportation problem solving. These activities were continually evaluated and revised for effectiveness.

A major undertaking of this eighteen week period was the authorship of an ITEC grant proposal for a computer communications system. The new technology education facility had been designed with a Communications Laboratory; a substantial investment in hardware and software was essential for the new facility to acquire adequate instructional equipment. Under the guidance of Dr. David McCrory, West Virginia University's Project Open coordinator, the curriculum consultant and the Chartiers-Houston technology education teachers prepared a $30, 0000 equipment and software proposal.

Another transition in the Chartiers-Houston Technology Education Program occured when Mr. Paul Siciliano assumed the responsibilities of curriculum consultant in January, 1988. Ms. Hill's work had laid an excellent foundation in technology education curriculum development: the Chartiers-Houston teachers understood the conceptual perspective of technology education and activities that incorporated these concepts were being utilized within the classroom, the new Technology Education Laboratory was under construction and the computer communication system grant proposal had been submitted. A positive and productive atmosphere for the continual development of the technology education curriculum was evidence of her professional effectiveness.

Chartiers-Houston administration was pleased with the success of the technology education curriculum within the classroom environment. All grades, 7-12, were recieving instruction in an "Introduction to Technology", with content and activities appropriate to their grade level. Administrative procedure dictated, however, that fully developed and board approved curriculum plans be on file in the administrative office prior to implementation of instruction. The circumstances of construction permitted a slight relaxation during the 1987-1988 school year, but the technology education teachers and the curriculum consultant were informed that no instruction would be permitted during the 1988-1989 school year until curriculum was formally presented to the Chartiers-Houston School Board and had received board approval. Although the scope and sequence of Project Tech's technology education infusion called only for the development of the 7th grade curriculum during this time frame, the necessity to remain in compliance with Chapter 5 regulations took precedent.

The initial meeting with the school board to present an overview of the proposed technology education curriculum and submit the 7th grade document for board review took place in April. Mr. Ciferno, Mr. Siciliano, Dr. McCrory and Dr. Joseph Pecosh of California University of Pennsylvania, Project Tech Director, were in attendance. In addition to a slide presentation, explanatory literature and a discussion session pertaining to technology education, it was also announced at this meeting that the communication grant funding had been approved. The 7th grade curriculum, *Exploring Technology*, was submitted, reviewed by the board and a vote of approval was confirmed later in the month.

Development of *Applying Technology* (8th), *Creating Technology* (9th) and *Materials Processing* (10-12th) as 1988-1989 course offerings were planned for the remainder of the school year. With the receipt of the communications grant funding we were informed that it would also be

necessary to develop a *Communication Technology* (10-12) course prior to use of the equipment. The deadline for submission to the the Superintendant, Ms. Dorothy Dillemuth, was one week prior to the June meeting of the Chartiers-Houston School Board. The 8th-12th grade curriculum offerings: *Applying Technology, Creating Technology, Materials Processing and Communication Technology* were submitted, reviewed by the board and approved during their June business meeting.

The curriculum, as approved, is not final. It requires revision and refinement on a continual basis to meet the needs of learners in an ever evolving technological world. An advisory council has been formed to assist in the continual development of the technology education curriculum. Representatives from the local business, industrial and professional community have donated their time to work in conjunction with school board members, parents, administrators and technology teachers to improve the program for the benefit of the students. The input of this council will insure the continued quality of the curriculum.

Prior to the transition to technology education at Chartiers-Houston there had been a decline in enrollment within the industrial arts program. This was one of the motivations for the administration's support of the curriculum change; it was also significant for another reason. Mr. Kotyk has dual certification. industrial arts and social studies. During the 1987-1988 school year he had four social studies assignments and one in technology education. Administrative plans for the 1988-1989 school year do not call for Mr. Kotyk to instruct technology education; Mr. Ciferno will handle all six technology education offerings. An enrollment increase of more that 10% * in technology education was reflected during scheduling for the 1988-1989 school year. Registrations reveal a great interest in the Communications Technology offering for the high school; there will be two sections of this course on the 1988-1989 schedule.

To prepare the technology education instructors for the *Communication Technology* course, inservice instruction was arranged through California University of Pennsylvania with Dr. John Kallis. Dr. Kallis served as a consultant when the grant proposal was being prepared; the proposed system was based upon the equipment and software he utilizes to instruct Communication Technology at California University of Pennsylvania. Participants in the inservice included the technology education teachers, Mr. Anthony DeFife, Chartiers-Houston computer teacher, Mrs. Paulette Daniels, Chartiers-Houston curriculum secretary, and Dr. Thomas Zellars, Chartiers-Houston Jr./Sr. High School Principal. The inservice instruction was held during the month of July, beginning in the Communications Laboratory at California University with an introduction to the system and preliminary exercises. The instruction moved to the Chartiers-Houston Communications Laboratory with the arrival of their equipment; the system was set up and initialized. Each participant in the inservice workshop took a computer home for practice until the beginning of the 1988-1989 school term. Dr. Kallis is available for additional inservice instruction during the school term when the instructors are more familiar with their needs through experience.

Mr. Kotyk participated in the communications inservice workshop and has offered his assistance during his preparation period in the communications laboratory. He is also participating in the development of co-curricular activities coordinating social studies and technology. The administration is supportive and has stated that Mr. Kotyk will be assigned technology education classes if enrollment continues to increase.

The potential for technology education at Chartiers-Houston is significant. The students are excited and proud of the sophisticated communications system and their new facility; they are also quite anxious to use the equipment in the materials processing laboratory. The construction is not complete in the technology education facility;

Mr. Ciferno will be conducting all classes in the communications laboratory through October. The communications laboratory is a model facility within the added wing at Chartiers-Houston containing the Art, Computer Science and Home Economics departments. The lab is attracting quite a bit of attention among members of the faculty that had little previous contact with the industrial arts department: the English department has considered it's usefulness in publishing the school newspaper and computer science had the foresight to participate in the inservice workshops. Interdisciplinary instruction is also being developed with the art and the science departments. Technology education is a valuable resource to the members of the Chartiers-Houston educational community, it's prospects only limited by their imaginations.

The develpoment of an additional high-school elective, *Materials Processing*, is scheduled for completion during the 1988-1989 school year. The addition of specific evaluation procedures within the formal curriculum format is a significant forthcoming revision, along with ongoing refinement of the approved curriculum.

* Total 1987-1988 enrollment: 97
Total 1988-1989 enrollment: 108

INTRODUCTION

As a result of having attended the Teacher Enhancement Centers directed by California University of Pennsylvania and supported by participating local school districts, we have become increasingly aware of the impact technology is having on the society in which our students will live and work.

Based on information provided by the Enhancement Centers, we participated in two types of program evaluations. The first was an internal, self evaluation of the present industrial arts curriculum and instructional program at Chartiers-Houston. The second evaluation was an external evaluation focusing on our shop facilities. These evaluations made us realize that our present program was not sufficiently preparing students to live and work in our technological society.

The proposal for change included here will help direct our actions during the next five years in achieving the goal of technological literacy for all students. This goal of technological literacy was identified recently in the Pennsylvania Technology Education Program Guide: K-12. In addition, these changes will keep us current with the national trend toward technology education.

An important part of this plan is on our desire to maintain a high level of competence with the new technologies, to develop our curriculum and instructional program, and to develop and maintain state of the art lab facilities.

Technology Education Program

College of Human Resources and Education
Morgantown, West Virginia
26506

West Virginia
University

Dear School Administrator:

The April 1985 (Vol. 14, No. 4) issue of the NASSP Curriculum Report describes how industrial arts is changing to technology technology. These new technology-based programs focus on the study of transportation, construction, manufacturing, and communication, which is consistent with the industrial arts curriculum plan recently developed the the WV Department of Education.

School curriculum change takes time and effort. If you would like to help your industrial arts teachers transition to technology education, we can provide assistance. "Project Open," a curriculum improvement and staff development service, operates on a cost-recovery basis in conjuntion with the graduate program in technology education at West Virginia University. We have conducted Project Open in 14 schools and a community college (see white paper attached) since 1973.

Whether you need help for existing teachers or have a teacher vacancy, Project Open can assist (see green sheet attached). We would be pleased to discuss how Project Open can be adapted to your specfic needs.

Lead-time is essential, so please contact us at your earliest convenience.

Sincerely,

David L. McCrory, Program Coordinator
Technology Education
(293-3803/3804)

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enc

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Curriculum Report
Vol. 14 No. 4 April 1985

Technology Education: A Modern Focus for Industrial Arts

Readers who have taken a careful look at today's industrial arts courses and programs are probably surprised that they are very different in focus and content from the courses they may have taken in their middle and high school years. And more changes are in process; efforts are currently under way to adjust the focus of industrial arts instruction in the schools to concentrate more on the study and understanding of technology and its role in our lives during the final years of the 20th Century.

This *Curriculum Report* considers *the nature and some of the consequences of this movement to transform industrial arts education into technology education.*

The Past Is Prologue

This movement is only the most recent step in an essentially orderly evolution of an industrial arts curriculum that will reflect the character and serve the needs of the society in which it exists. A brief review of that curriculum evolution, especially in the last 40 years, will show that the recommendation to convert industrial arts education to technology education is consistent with the history of this instructional field.

Changes that the American Industrial Arts Association (AIAA) has made in the title of its monthly journal provide a framework for this review, for they are like signposts along this curriculum road.

The early years of this century saw manual *training* and then manual *arts*. But the 1930s witnessed a shift in focus from *manual* arts to *industrial* arts. That change in purpose and subject matter had far-ranging and long-lasting effects on programs in the schools. It was natural, then, that when the American Industrial Arts Association was formed in 1939 its journal should be titled *The Industrial Arts Teacher.*

In 1963 that title was changed to *The Journal of Industrial Arts Education.* Not much of a change, it might seem, but behind it was the profession's growing awareness of the significance of the emerging space-age technology and other societal changes to industrial arts curricula.

This awareness sharpened and expanded until it became evident that the comprehensiveness of the Association's interests, and of the profession as a whole should be reflected in the title of the journal.

In the fall of 1970, the publication became known as *Man/Society/Technology.* In the first issue under the new name, the editor wrote, "The name change has not been made merely for the sake of change, but rather in response to a continuing effort to meet the needs of society."

During the 1960s and '70s, as curriculum developers became more sensitive to the increasing complexity of our technological society and to the need for greater occupational information in order to understand and properly interpret the role of industry in today's world, numerous proposals were made for updating industrial arts instruction. The literature of those years reveals references to more than 35 innovations which, for the most part, emphasized industry and technology as the dominant goal of industrial arts instruction.

For many years industrial arts programs have been built around broad occupational areas such as metalworking and printing. Many such *industry-based* shop programs have been replaced or substantially modified because they tend to focus on specific occupational skills to the exclusion of a more comprehensive study of industry as a whole. That replacement has taken several forms, but probably the most popular pattern at the moment, at least at the middle school level, is the study of *industrial clusters,* which provides a broad, integrated view of the industrial/technical aspects of American society. This approach is exemplified by a curriculum developed during the 1960s by the Industrial Arts Curriculum Project (IACP) at The Ohio State University.

The IACP studied industrial technology, which was defined as "that knowledge which is used to satisfy man's wants for industrial material goods, and it is composed of two principal industrial divisions — construction and manufacturing." IACP developed and carefully field-tested two, year-long middle school-level courses: The World of Construction, and The World of Manufacturing.

Both courses extensively use group-learning activities as opposed to the individual projects typical of most traditional courses. Students in The World of Construction are involved with the sequential activities common to building *any* structure, such as surveying, sketching plans, addressing topological problems, applying building codes, and planning for the community. In The World of Manufacturing, planning a production line for a

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Technology Programs

Teacher Enhancement Centers

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John R. Wright

Technology education today faces the critical issue of inservice education. The public school cannot meet the needs of technology teachers who are trying to transition their programs from industrial arts to technology education through one or two days of inservice.

The demands for curriculum development, instructional re-tooling, facility planning, and the implementation of new student activities which are keyed from math and science concepts will require a substantial commitment to inservice education if the change to technology education is to become substantive. Aside from these mechanical changes, a comprehensive approach to inservice education must also address the need to motivate faculty, teacher burnout, new pedagogical developments, and technical (high tech) content.

Cooperative Inservice Education

A comprehensive approach for inservice education has been developed in southwestern Pennsylvania. Two Teacher Enhancement Centers with 15 school systems are linked to California University of Pennsylvania to provide a comprehensive inservice program for math, science and technology education teachers. The Schenley Teacher Center in Pittsburgh served as a model, but the Southwestern Pennsylvania Enhancement Center differs in respect to the university linkage and the funding by local and vocational education monies.

Organization

The center came about through the work of the Superintendent of the Monessen Public Schools, Dr. Thomas Wilkinson, who approached university officials with the idea of a cooperative inservice program. His point was direct and simple. Each school district had limited resources for inservice, but collectively the resources could provide more opportunities for teachers over a longer period of time.

The University Dean of Education, Dr. William Benedetti, offered to provide a half-time director at no cost to participating school districts, and the

Dr. John Moreschi provides the total group in the Chartiers Valley Enhancement Center with tips on how to motivate young learners.

John Wright is an Assistant Professor in the College of Science and Technology at the California University of Pennsylvania.

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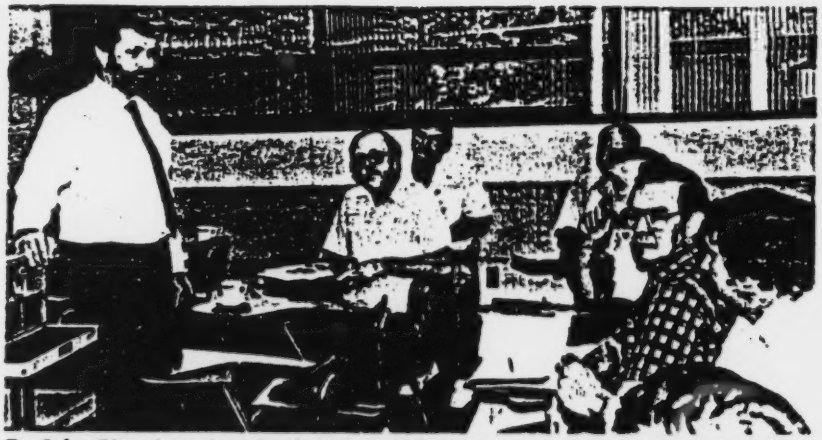
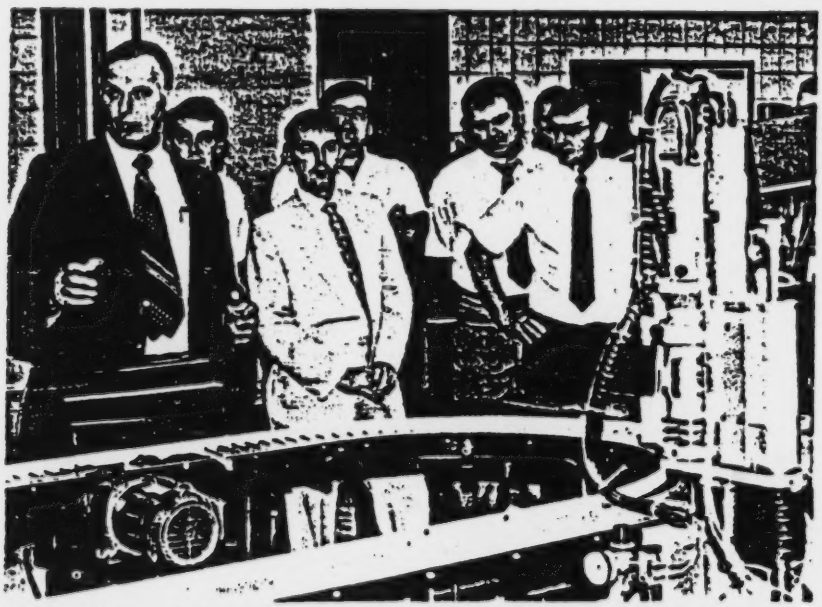


Dr. John Ritz, Associate Professor at Old Dominion University, Norfolk, Va., works with the teachers in a workshop format to help them develop student activities for technology education which are action based and reinforce math and science concepts.



Dr. Joseph Pecosh demonstrates the use of robotics for manufacturing cell work during a technical update session.

Enhancement Center concept became reality.

The two Enhancement Centers, now in their fourth semester of operation, provide inservice education one full day each week for 15 weeks to selected math, science, and technology education teachers. About half of the sessions deal with common topics such as teacher burnout, motivation, questioning techniques, testing, class organization, etc. Selected field trips and a variety of hands-on workshops for each discipline area make up the other half. This article will focus on the technology education area.

Technology Education

During the special topic sessions for technology education teachers, the focus is on changing the curriculum to technology education. At the beginning of each semester, the teachers are involved in the selection of resources, topics and consultants that they would like to have. As a result of their input, a number of nationally known leaders have been retained to provide all day inservice sessions on topics such as philosophy, content, instructional strategies, student activities, curriculum writing, facility development and long range planning.

Content Update

In addition to having special weekly sessions at the Enhancement Center, all teachers spend a few days at California University to improve their skills in the use of new science equipment, computers, robotics, numerical control machines, and the computer aided drafting and design system.

Sometimes the teachers work together to share ideas and common curricula concepts that could be taught collectively, and at other times the teachers are separated into their own field specialties. The inservice purpose is to help teachers improve science and technological literacy within their school districts.

Outcome

The Enhancement Center concept has been extremely well received by both the administrators and teachers involved. Special professional associations between the teachers now cross the school boundaries in such areas as computer software swaps, instructional strategy materials sharing, and collective technology resources sharing.

Former members of the teacher enhancement centers have formed an alumni association and plan to meet each spring for a dinner and renewed professional discussions.

Superintendents were asked to follow-up with the necessary resources to support the enhancement center teachers' ideas when they returned to the classroom. To date, several new projects have been started.

Of particular interest is the commitment of one superintendent to completely remodel and re-equip the school's program for the systems approach; another has indicated support for curricula change and a new CAD system. A third has purchased computerized typesetting equipment, and a fourth superintendent has convinced her school board to build three new technology education laboratories based on the clusters of production, communication, and transportation.

In addition to the local achievements of the technology education teachers, Jack Jones, a junior high teacher in the Canon-MacMillan School District, was selected by state officials to work on the Pennsylvania State Plan for Technology Education this past summer.

Also significant has been the support of the Pennsylvania Department of Vocational Education. During the past year two proposals to support the costs of the

technology education teachers were submitted and funded. Such funding has meant a much higher quality program and provided school superintendents and teachers with a great deal of psychological support for the project.

Conclusion

The Teacher Enhancement Center concept is a long rangecomprehensive approach to inservice education for math, science and technology education teachers. The idea of pooling the resources of local school districts, the state and the university is most promising and results in action based and meaningful inservice experiences for teachers.

It is an ideal relationship for teachers who are trying to transition their programs towards the study of technology. The immediate rewards are obvious and the long term possibilities—unlimited!

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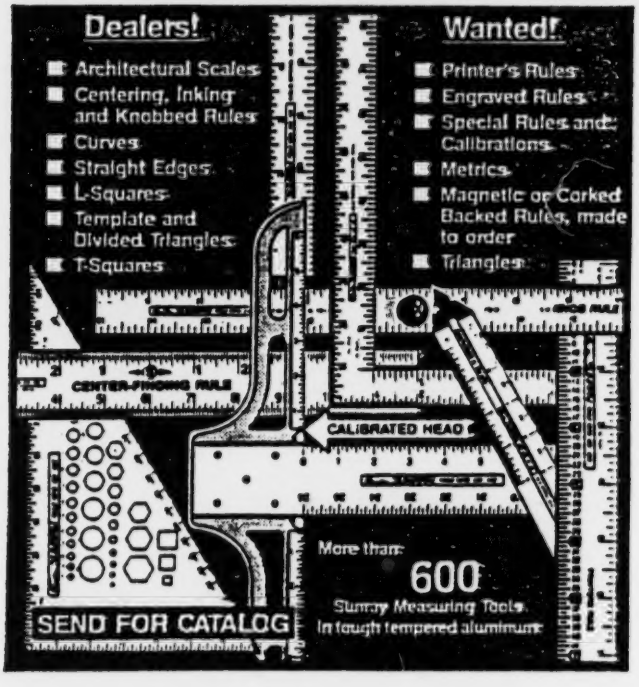

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DEFINITION OF TECHNOLOGY EDUCATION

Technology education is an integral part of the general education of each student. It is a comprehensive activity-based program that is concerned with understanding the evolution, application, and significance of technology; and the organization, personnel, systems, techniques, resources, and products of industry; and the social/cultural/environmental impacts of technology and industry.

GOALS FOR TECHNOLOGY EDUCATION*

Technology Education...

- -Assists students in developing insight, understanding and application of technological concepts, processes, and systems;
- -Reinforces basic skills interrelating the three technological systems (communication, production, and transportation) with other school subjects;
- -Provides students with opportunities to apply tools, materials, machines, processes, and technological concepts safely and efficiently;
- -Develops student skills, creative abilities, self-concepts, and individual potentials in technology;
- -Develops problem solving and decision-making abilities involving human and material resources, processes, and technological systems;
- -Assists students in making informed educational and occupational decisions related to careers in technological area;
- -Prepares students with leadership experiences;

-Provides students with hands-on, activity-based, laboratory experiences designed to reinforce technological concepts;

-Emphasizes both "know how" and the "ability to do" in conducting technological work;

-Assists individuals in acquiring information about and developing an interest in consumer knowledge and leisure time activities.

*adapted from PA Technology Education Program Guide: K-12

TECHNOLOGY DEPARTMENT

EXPLORING TECHNOLOGY — Grade 7 (required) 9 weeks

Introduction to Technological Systems will provide students with an overview of the three systems of technology: Communication, Production, and Transportation/Power. Students will study important historical developments in each system, apply the system model approach to a group project, and investigate the impacts of technology on people; their careers, society, the environment, and the future.

Students will perform hands-on, problem solving activities related to the safe and efficient completion of the group project.

APPLYING TECHNOLOGY — Grade 8 (required 9 weeks

Technological Processes will provide students with a series of concentrated, hands-on experiences related to the application of tools and the processing of materials relevant to Communication, Production, and Transportation/Power technology systems.

Students will be involved in a series of teacher-designed laboratory activities and experiments focusing on the tools, materials, and processes of technology.

CREATING TECHNOLOGY — Grade 9 (elective) 36 weeks

Technological Enterprise will provide students with the opportunity to apply the knowledge and skills developed in the Introduction to Technology Systems and Technological Processes courses to the creation and operation of an enterprise system (company).

Students will form a company for the purposes of producing a product or providing a service. Students will function in various capacities within the enterprise by applying Communication, Production, and Transportation/Power technology.

Full year - 5 periods - 1 unit — Prerequisite: None

COMMUNICATION TECHNOLOGY Grades 10-12 (elective) 36 weeks

Communication Technology is a specialized course which provides students with an introduciton to the fundamental technical concepts and processes related to graphic and electronic communication technologies. Activities will include mechanical drawing, design, audio visual production, screen printing, lithography, photography, computer graphics. Students will create the products of these industries and assess the impacts of the products on people and society.

Full year - 5 periods - 1 unit Prerequisite: None

MATERIALS PROCESSING Grades 10-12 (elective) 36 weeks

Materials processing provides student with an introduction to the properties of industrial materials, the production of standard stock, and the transportation of standard stock into finished products. Emphasis of the course is on introductory concepts common to all processes relating to wood, metal, and plastics. The content is presented through activity based methodologies. The goal is to provide a broad picture of materials and processes as well as traditional development of manipulative skills.

Full year - 5 periods - 1 unit Prerequisite: None

Area schools targeted for education money

Four area school districts and one vocational-technical school will receive substantial boosts to their computer-aided instructional plans.

The news came in the form of an announcement that the Pennsylvania Higher Education Assistance Agency will award them Information Technology Education for the Commonwealth (ITEC) grants to set up computer-equipped classrooms.

Based on competitive proposals by 293 school districts, the local awards are: Chartiers-Houston School District, $28,727; McGuffey, $30,000; Ringgold, $29,726; Southeastern Greene, $29,102.80; and Mon Valley Vocational-Technical School, $29,446.

The Information Technology Education Act was created by the Pennsylvania General Assembly to help Pennsylvania schools implement computer-based instruction. It also provides PHEAA-adminstered ITEC courses through the regional centers that provide training for both elementary and secondary teachers in the use of microcomputers in the classroom, and the evaluation of computer courseware. The grants are used for computer hardware and software.

This is the fourth and final year of the grant program. However, the Legislature may extend it.

MEMORANDUM

TO: Mr. Ciferno
FROM: Mrs. Dillemuth
DATE: April 19, 1988
SUBJECT: Technology Course & Text

At its April 18, 1988 regular meeting, the Board of Education approved the grade 7 Exploring Technology 9 week course and technology textbook, "Living With Technology."

We are anxiously awaiting your grade 8 & 9 curriculums and proposed senior high electives. Please let me know when they will be ready for board approval. Chapter 5 regulations and the school code are explicit in that no course may be taught without prior board approval.

cc: Dr. Zellars
Mr. Dell
Mr. Stultz

Wednesday, May 18, 1988

- Advisory Council met 5:30 PM at Hoss's in Canonsburg for dinner meeting

- Business session followed in Room 102 at Chartiers-Houston High School 7:30 PM

- Those in attendance: J. Ciferno, Paul Siciliano, Mrs. Phyliss Ryburn, Mr. Jim Daniels, Mrs. Paulette Daniels, Mr. Charles Fife

- Items of business: General overview of technology education at C-H

  -Review proposed T.E. Curriculum at C-H
  -Philosophy of T.E. at C-H
  -Toured new lab facilities - Production and communication
  -Discussed role of advisory council members
  -Suggestions for additional advisory council members
  -Question and answer session followed
  -Meeting adjourned 10:05 PM
  -Another meeting has not been scheduled as yet
  -Others in attendance: Dr. J. Pecosh, C.V.P.; Dr. M.McCrory, WVU; Paula Vorgang, Jack Jones, Van Hughes-Teap, Gene [illegible]

CHARTIERS-HOUSTON JR. SR. HIGH SCHOOL

TECHNOLOGY DEPARTMENT

STATEMENT OF PHILOSOPHY

The Chartiers-Houston School District Technology Education Program is a comprehensive, action-based program concerned with the transportation systems, and their impact on people, society, and the environment. Technology education is a vital part of every student's education-- technology does not discriminate; it affects everyone. It is vital for individuals to understand concepts of technology if they are to function as informed voters, productive workers, and discerning consumers of technological goods and services.

Technology education is designed to promote discovering, thinking, creating, and problem solving skills in each of the four systems of technology; with a balance of historical, theoretical, and practical information. Technology education courses will continue to have the activity-based, hands-on, experiential learning heritage of Industrial Arts, but the focus will be to prepare students with the understanding, attitudes, and skills needed to function effectively in a technological society.

The ultimate goal of technology education is to promote technological literacy; providing students with the opportunity to apply their skills, knowledge, and attitudes to the solution of technological problems.

Technology teachers must maintain a high level of competence with the new technologies, develop their personal creativity and ingenuity, foster an attitude conducive to change and improvement, enjoy working with young people, and maintain the highest degree of personal and professional integrity.

GOALS OF THE CHARTIERS-HOUSTON TECHNOLOGY EDUCATION PROGRAM

The technology education program at Chartiers-Houston is exploratory, comprehensive, interdisciplinary and integrated among the grade levels. This program provides hands-on experiences with tools, processes and resources of the major technical systems. Attention is given to the impute, process, output, feedback and modification of each system. Students who experience technology education activities mature as they:

-Appreciate the breadth of contemporary technology;
-Use safely selected tools, machines, materials, and processes;
-Identify relevant occupations, careers and educational programs in technological fields;
-Experience the management and labor organizational structure of technological enterprises;
-Research, plan, design, produce and evaluate technological products and services;
-Understand and apply the technological problem solving method;
-Apply and reinforce math and science skills in practical situations and in life skills development; and
-Perform computer applications in technological areas.

SCOPE AND SEQUENCE

5 year plan

87-88 Introduction to Technology

	88-89	89-90	90-91	91-92
7	Exploring Technology			
8	Applying Technology			
9	Applying Technology	Creating Technology		
-12	Comm. Tech. Matls. Proc.	Comm. Tech. Matls. Proc. Prod. Tech.	Comm. Tech. Construction Manuf. R & D	Comm. Tech. Construction Manuf. R & D Trans.

TECHNOLOGY EDUCATION PROGRAM, GRADES 7-12

SCOPE

The Chartiers-Houston technology education program provides an understanding of technology and its social/cultural environmental impact. This program provides broad and exploratory experiences in the technical systems of communication, transportation and production.

PLANNED COURSES AND SEQUENCE

The structural technology education experience begins with the Exploring Technology course. This course introduces the student to technology and focuses on new technology affects the individual, society and the environment. The student will discover the technical systems of communication, transportation and production. Individual and group activities will provide interesting and exciting experiences as the student explore each of these three areas.

A second course entitled Applying Technology will provide an in-depth look at the importance of the elements of technology, including people, materials, tools, information, processes, and energy. The importance of the elements to the three technical systems will be examined through individual and group activities. The student will design, develop and create video productions, structures, transport vehicles and other interesting experiences as the students apply technology. The junior high school technology education program will conclude with the Creating Technology course. This course provides students with the opportunity to apply knowledge and skills in communication, transportation and production to the establishment of an enterprise system. The students will form a company which creates a product.

The senior high technology education program is individualized and specialized. In-depth study is provided in the technical systems of communication, transportation and production. Emphasis is given to the application of mathematical and scientific principles. Technological enrichment, career development and technical literacy are provided, while broad employability skills may be developed.

MEMO

TO: Dr. Thomas Zellars
Mrs. Dorothy Dillemuth
FROM: Joe Ciferno
RE: Technology Education Advisory Committee
DATE: May 4, 1988

The following people have been contacted and have agreed to serve on an advisory committee for Technology Education. I am submitting this list for your approval in order that I might invite them to the May 18, 1988 meeting here in our new facility. This meeting will present the status of Technology Education here at Chartiers-Houston.

Mr. Charles Fife - Fife Moving and Storage
Mr. Richard Hall - Board of Education
Mr. Harlan Shober - President of Board of Education
Mrs. Phyllis Ryburn - Union Camp
Mr. William Kotyk - Teacher at Chartiers
Mrs. Paulette Daniels - Library Assistant at Chartiers

JC/dd

APPENDIX

F

PROJECT PERSONNEL

Dr. James Johnston, Assistant Superintendent - Canon-McMillan School District

Dr. Donald Strang, Superintendent - Canon-McMillan School District

Edward Koman, Principal - Cecil Junior High School

Jim Zanardelli, Technology Teacher - Cecil Junior High School

Joseph Osinski, Principal - Canonsburg Junior High School

Dr. William Renko, Assistant Principal - Canonsburg, Junior High School

Jack Jones, Technology Teacher - Canonsburg, Junior High School

Joe Gowern, Technology Teacher - Canonsburg Junior High School

Nick Bayat, Principal - Canon-McMillan Senior High School

Jon McCrory, Technology Teacher & Chair - Canon-McMillan Senior High School

Perry Weightman, Technology Teacher - Canon-McMillan Senior High School

Roger Chambers, Technology Teacher - Canon-McMillan Senior High School

Dr. John Wright, Associate Dean - College of Science & Technology
California University of Pennsylvania

Dr. Nevin Andre, Chair - Technology Education, California University
of Pennsylvania (CUP)

Dr. Joseph Pecosh, Director - Project TECH, CUP

Paul Jacobs, Research Assistant - Project TECH, CUP

Larry Collins, Research Assistant - Project TECH, CUP

Dr. David McCrory, Director - Project Open, West Virginia University (WVU)

Paula Vorgang, Curriculum Consultant - Project Open at Canon-McMillan, WVU

Paul Siciliano, Curiculum Constultant - Project Open at Chartiers-Houston, WVU
(January 1988 - present)

Colleen Hill, Curriculum Consultant - Project Open at Chartiers-Houston, WVU
(September - December 1987)

Kendra Jackson, Secretary, WVU (April 1988 - present)

Sandy Machnik, Secretary, WVU (September 1987 - March 1988)

Dorothy Brendt, Secretary - Project TECH, CUP

CANON-McMILLAN SCHOOL DISTRICT
222 North Central Avenue
Canonsburg, PA 15317

TECHNOLOGY EDUCATION

Junior High School Curriculum Guide

Developed by:

Department of Technology Education
West Virginia University
Morgantown, WV 26506

Revised - June 8, 1988

ACKNOWLEDGEMENTS

The development of the technology education curriculum for the Canon-McMillan School District was developed by West Virginia University-Technology Education Department's Project Open as part of Project TECH with California University of Pennsylvania.

This project was funded in part by the Pennsylvania Department of Adult and Vocational Education, California University of Pennsylvania, West Virginia University, and the Canon-McMillan School District.

This curriculum guide is the culmination of efforts made by the project personnel at Cecil Junior High School, Canonsburg Junior High School, and Canon-McMillan Senior High School. Recognition is extended to the following:

Roger Chambers, Canon-McMillan Senior High School
Larry Collins, California University of Penn ylvania
Colleen Hill, West Virginia University
Paul Jacobs, California University of Pennsylvania
Jack Jones, Canonsburg Junior High School
David McCrory, Canon-McMillan Senior High School
Jon McCrory, Canon-McMillan Senior High School
Joseph Pecosh, California University of Pennsylvania
Paul Siciliano, West Virginia University
Perry Weightman, Canon-McMillan Senior High School
Jim Zanardelli, Cecil Junior High School

CANON-McMILLAN SCHOOL DISTRICT
222 North Central Avenue
Canonsburg, PA 15317

A. THE CANON-McMILLAN PHILOSOPHY OF EDUCATION

Excellence in education is not merely transferring to children the culture of the past, but the culture of the present.

- - Sir Ronald Gould

In our dynamic world society, change is the mode of the times. The population explosion, the increased rate of production, the development of new materials, the modern methods of communication and transportation, the application of nuclear energy, and the concern for all peoples have extended the range and depth of the learning process. Understanding our involvement in this world of change is education's challenge.

Because our public school is the product of the democratic form of government, the school strives to perpetuate the American way of life. To live happily and successfully, youth needs a frame of reference that provides emotional stability. In this age of science and materialism, character development, based upon moral and spiritual values, assumes paramount importance.

We place first emphasis on understanding the child. Since the children in the Canon-McMillan Schools come from widely different socio-economic backgrounds, the school endeavors to reach abilities ranging from the non-educable to the gifted. For this reason, each child in our school system encounters a democratic learning situation where he may achieve optimum social, emotional, physical,

intellectual, and attitudinal growth according to his needs, interests, and abilities.

To provide this maximal child growth in an ever-changing and keenly competitive world, education must keep pace with the industrial, business, political, and community life. Cooperative planning, directly and indirectly by administrators, by parents, by organized lay groups, and by various specialists in the field of education, is also essential. Thus the school provides a comprehensive and balanced program of learning experiences.

B. DEFINITION OF TECHNOLOGY

Technology is a process undertaken in all cultures (a universal), which involves the systematic application of organized knowledge (synthesis) and tangibles (tools and materiel) for the extension of human faculties that are restricted as a result of the evolutionary process. (Pytlik, Lauda, & Johnson. (1978). Technology, Change and Society. Worcester, MA: Davis.)

C. DEFINITION OF TECHNOLOGY EDUCATION

Technology education is an integral part of the general education of each student. It applies problem solving activities and focuses on a systems approach to develop technological literacy. The technical systems of communication, transportation and production provide three broad content areas of study. This comprehensive activity based program is concerned with understanding the evolution, application and significance of technology on the individual and society.

D. PHILOSOPHY OF TECHNOLOGY EDUCATION

The creation of technology is uniquely a human endeavor and a distinguishing characteristic of our developed civilization. Technology is the application of organized knowledge and problem solving techniques. It consists of inventions, innovations and other creative developments for producing physical objects and performing technical services. Technology involves the resources, tools, machines, processes and systems that are needed for satisfying the material needs and desires of people. It includes the processes of design, engineering, invention, research, experimentation, development, production and control. The development and application of technology has occurred primarily in industry, our major economic institution. Both technology and industry have provided benefits and problems for our society, culture and environment. Upon this content base, experiences in technology education are planned and implemented.

Technology education focuses on systems approach to develop technological literacy. The systems of communication, transportation, and production provide broad content areas of study. Technology education provides a vital link in the math/science/technology triangle to assist with understanding, living and working in our advanced technology/information era. Its interdisciplinary nature also helps students to comprehend and apply the natural sciences, social sciences and humanities.

A holistic approach is employed in technology education. student is actively involved in classroom/laboratory activities that develop knowledge, skills and attitudes regarding industry and technology. Emphasis is given to nurturing leadership, communication, social interaction, problem solving and manipulative skills. Personal and social growth is fostered through interaction with other students in the laboratory and in student technology education organizations. The technological method of problem solving is experienced in identifying a problem, collecting and analyzing data, generating alternatives, synthesizing a design or plan, developing a proposed product or service, and evaluating the process and the results. Throughout this educational process, the students are taught to explore avocational and vocational interests and to make wise consumer, citizen and career decisions.

E. GOALS OF TECHNOLOGY EDUCATION

The goal of technology education is for the learners to become technologically literate, and thus be able to:

- Interpret the evolution of technology and its relationship to mathematics, science, society and industry;
- Establish beliefs and values based on the impact of technology and how it alters human capabilities and environments;
- Develop attitudes and abilities in the proper use of tools, processes, and resources of technological and industrial systems;
- Develop creative solutions to present and future societal problems using technology; and
- Explore and develop human potential related to responsible work, leisure, and citizenship roles in technological society.

F. SUGGESTED TIME GUIDELINES

Courses are designed for class meetings of 45 minutes in length meeting 5 days per week for a period of 9 weeks. All basic concepts will be introduced and reinforced regardless of the variations in physical facilities in each building.

G. EXPECTED LEVEL OF ACHIEVEMENT

Students are expected to complete assigned work to the best of their ability and will be encouraged and assisted to develop their individual talents and interests.

H. GOALS OF THE JUNIOR HIGH TECHNOLOGY EDUCATION PROGRAM 43

The technology education program at the junior high level is exploratory, comprehensive, interdisciplinary and integrated among the grade levels. This program provides hands-on experiences with tools, processes and resources of the major technical systems. Attention is given to the input, process, output, feedback and modification of each technical system. Students who experience technology education activities at the junior high level mature as they:

- Appreciate the breadth of contemporary technology;
- Use safely selected tools, machines, materials and processes;
- Identify relevant occupations, careers and educational programs in technological fields;
- Experience the management and labor organizational structure of technological enterprises;
- Research, plan, design, produce and evaluate technological products and services;
- Understand and apply the technological problem solving method;
- Apply and reinforce math and science skills in practical situations and in life skills development; and
- Perform computer applications in technological areas.

JUNIOR HIGH

SCOPE AND SEQUENCE

5 year plan

	87-88	88-89	89-90	90-91	91-92
7	Introduction to Technology (in development)	Exploring Technology Intro to Technology	→	→	→
8	Introduction to Technology	Applying Technology (in development)	→	→	→
9	Introduction to Technology	Applying Technology	Creating Technology (in development)	→	→

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J. TECHNOLOGY EDUCATION PROGRAM, GRADES 7-9

Scope

The junior high school technology education program provides an understanding of technology and its social/cultural/environmental impact. This program provides broad and exploratory experiences in the technical systems of communication, transportation and production.

Planned Courses and Sequence

The structured technology education experience begins with the Exploring Technology course. This course introduces the student to technology and focuses on how technology affects the individual, society and the environment. The student will discover the technical systems of communication, transportation and production. Individual and group activities will provide interesting and exciting experiences as the student explore each of these three areas.

A second course entitled Applying Technology will provide an in-depth look at the importance of the elements of technology, including people, materials, tools, information, processes, and energy. The importance of the elements to the three technical systems will be examined through individual and group activities. The student will design, develop and create video productions, structures, transport vehicles and other interesting experiences as the students apply technology.

The junior high school technology education program will conclude with the Creating Technology course. This course provides students with the opportunity to apply knowledge and

skills in communication, transportation and production to the establishment of an enterprise system. The students will form a company which creates a product.

This junior high school programs leads to the senior high technology education program that is individualized and specialized. In-depth study is provided in the technical systems of communication, transportation and production. Emphasis is given technological enrichment, career development and technical literacy, while broad employability skills may be developed.

K. SEVENTH GRADE COURSE - EXPLORING TECHNOLOGY

Course Description - Exploring Technology

Exploring Technology provides students with an introduction to technology, an overview of the technical systems: communication, transportation and production. Students study the evolution of technical systems, how technology is developing today and its impact on people and society.

Course Goals - Exploring Technology

The student will be able to:

1. Demonstrate and understand the use of the technical systems of communication, production and transportation.
2. Understand the role of competent and responsible technologically literate people as they carry out their daily functions as informed citizens.
3. Understand and appreciate the relationship between the individual, society, and technology.

Course Guide - Exploring Technology

1. This section contains the objectives, content, activities, materials, resources, and procedures for evaluation for the seventh grade course.
2. The numbers in parenthesis which follow each objective refer to Pennsylvania's 12 quality goals of education, Appendix A.

Inservice-Canon McMillan Technology Teachers 2/16/88

AGENDA

9-10 - Dr. Pecosh & Dr. McCrory

10-10:30 - Course Description review
Goal: possible suggestions for improvement

10:30-lunch - Content Outline review and revision
Goal: completion of 7th grade content outline

after lunch - Writing of Behavioral Objectives
Goal: complete list of objectives
what do 7th graders need to know about technology?

Inservice - Canon McMillan Technology Teachers @ CMHS

3/4/88 meeting notes HS

Strang wants to push up the time before 5 years

3/28 change deadline to 4/6

Biotechnology - relationship between living and non-living technical organisms

Brainstorming session of names for highschool classes

Bayat - okayed semester course change from full year

Inservice - Canon McMillan Technology Teachers

3/18/88 meeting notes JHS

4/6/88 - Technology Advisory Committee meeting

4/15/88 - Curriculum Materials

curriculum guide approval

suggested course guidelines
CH. 5 (minimums) - 1 course required, available to all grades 6-9. Min. 40 hours. 1/2 credit or 1 credit (address C, T, P)
CH. 6 (must for Perkins $) 120 hours required/end of 9th

Carl Perkins Act = administrative issue

phasing

JH - jack & Jim will complete quality goals and mail to Sandy

*revisions to be made on guide

Technology Education Program

College of Human Resources and Educati
Morgantown, West Virginia
26506

West Virginia
University

TO: Project Open/Project TECH - Canon McMillan Personnel

FR: Paula Vorgang

RE: End of year meeting

May 27, 1988

Please,be informed that there will be a final meeting to close out the 1987-88 school year for the Canon McMillan Technology Education Department.

The meeting is June 8, 1988 at 11:00. We will meet at Canon McMillan High School in room 824. We will address the high school curriculum, seventh grade curriculum, and plans for the coming school year.

Equal Opportunity / Affirmative Action Employer

Technology Education Program

College of Human Resources and Education
Morgantown, West Virginia
26506

West Virginia University

TO: Dr. Joseph Pecosh, Project TECH Director

FR: Dr. David McCrory and Paula Vorgang, Project Open

RE: Canon-McMillan end-of-year meeting notes

June 14, 1988

The following notes are the result of our June 8th meetings with the Canon-McMillan technology education teachers.

I. Junior High School Meeting

A. present: Jack Jones, Jim Zanardelli, Dr. D. McCrory, Paula Vorgang

B. Discussed scheduling for the 88-89 school year
1. Canonsburg Junior - tech. ed. in the 9th grade only, 18 weeks
2. Cecil Junior - tech. ed. required in the 7 & 9th grades, 9 weeks
8th grade elective

C. Revised the 7th grade curriculum guide

D. Jim recorded the dates of actual completion of objectives. A bar chart will be developed using the data.

E. Received a verbal listing of the equipment items purchased for 88-89

F. Planning our next meeting date for the Fall. Jack will notify us when the calendar comes out.

II. Senior High School Meeting

A. Present: Jon McCrory, Perry Weightman, Roger Chambers, Dr. D. McCrory, Paula Vorgang

B. Received a verbal listing of the equipment items ordered for 88-89

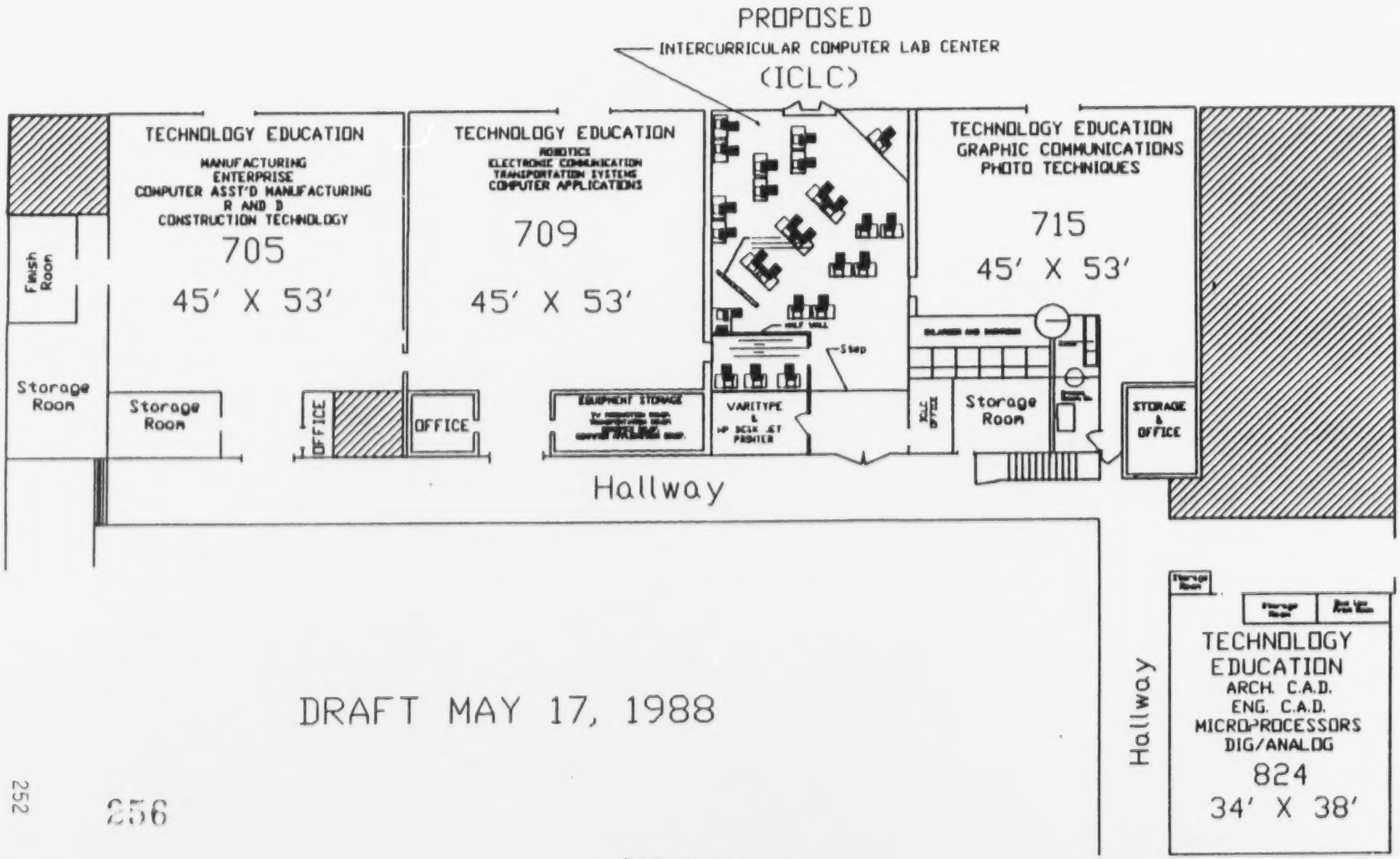
Equal Opportunity / Affirmative Action Employer

C. Discussed the new interdisciplinary computer lab which is being put in the technology education wing. (See attached drawing).

D. Discussed the plan for the development of the high school courses:

1. identified a course each teacher will begin developing
   a) Jon McCrory - Manufacturing
   b) Perry Weightman - Engineering CAD
   c) Roger Chambers - Graphic Communication
2. Summer and on-going - gather materials and activities, including textbooks for the teachers to review
3. Fall 1988 - each teacher will develop one course guide with the help of Project Open and Project TECH
4. December - course guide developed and equipment needs identified
5. Spring 1989 - present the material developed

E. Planning our next meeting date for the fall. Jon McCrory will notify us when the schedule comes out.



DRAFT MAY 17, 1988

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Project Tech/Project Open Planning Meeting

Technology Education Field Service Center
West Virginia University
September 18, 1987

AGENDA

9:00	Coffee & Donuts Introductions
9:30	Orientation to W.V.U. Tour (TERC, TERAD, TATTERSON)
10:30	Orientation to Project
11:30	Progress Report
12:00	Lunch w/Faculty
1:30	Planning: Tasks, Procedures, Communications
2:30	Dismiss

TO: CUP Project Tech Staff

FR: Dr. David McCrory, Paula Vorgang, Colleen Hill

RE: Project Tech/Project Open Planning Meeting #1

DATE: September 24, 1987

The following notes are from our September 18th meeting. It is our understanding that:

1) CUP's responsibilities:

   a) Search for activities related to the systems areas of technology: communication, construction, manufacturing, and transportation; send one copy of each activity to WVU.

   b) Prepare inservice training programs in the appropriate technical areas as requested (ie: CAD, robotics, Lasers).

   c) Provide technical assistance by producing necessary prototypes, testing equipment, jigs/fixtures, activity materials, etc., as requested.

   d) Recommend software packages applicable for a technology curriculum; for both IBM and Apple computers.

   e) Provide a list of concepts which should be included in a technology curriculum.

   f) Investigate the possibilities of the BITNET communication link.

   g) Set up an information resource center at CUP.

2) WVU's responsibilities:

   a) Search for activities related to the system areas and send one copy of the appropriate activities to CUP.

   b) Initiate communications when a task needs attention.

   c) Regular visits to the project sites.

   d) Curriculum development.

   e) Assist teachers in choosing, learning, and teaching activities.

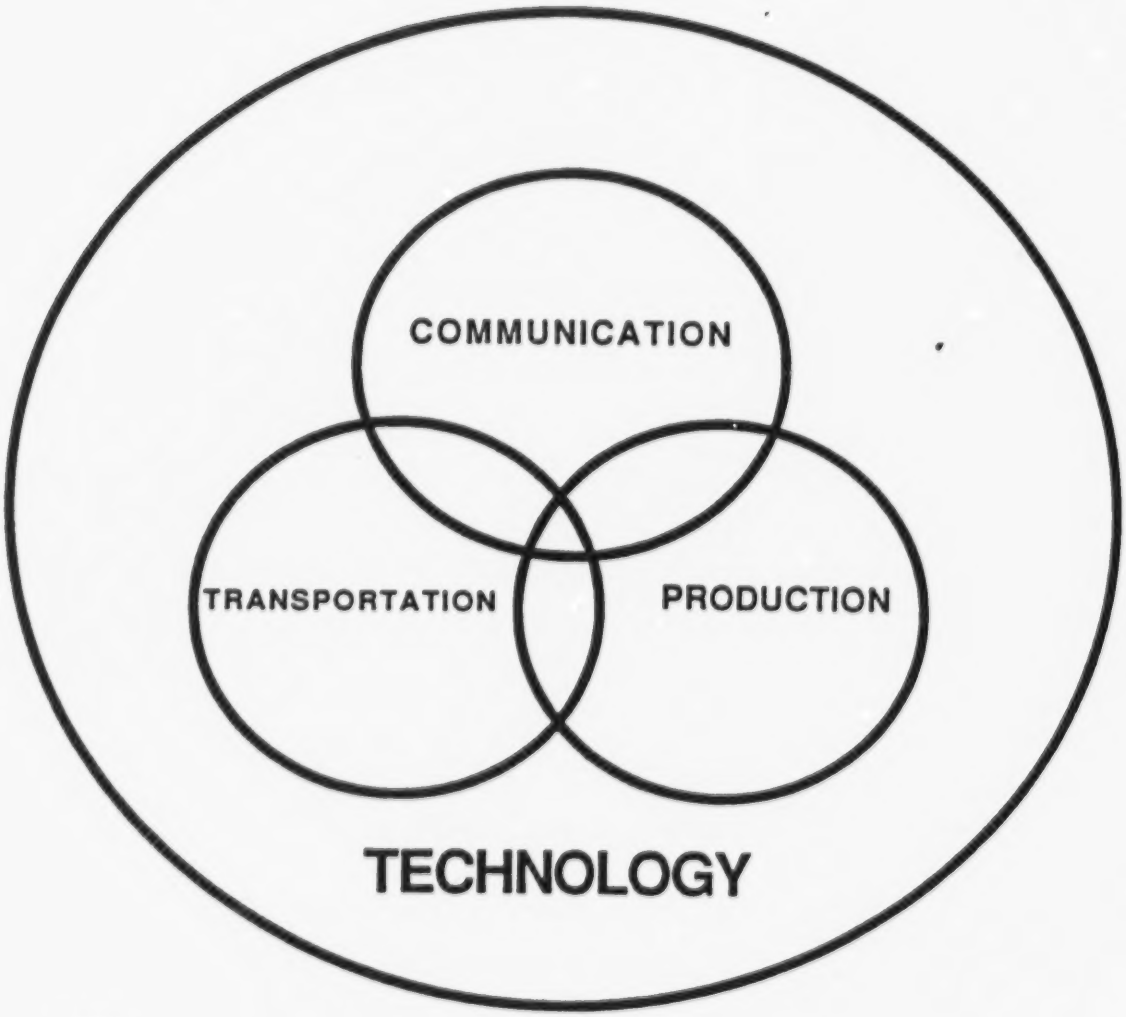
   f) Daily lesson planning for school activities.

   g) Develop short and long term curriculum plan.

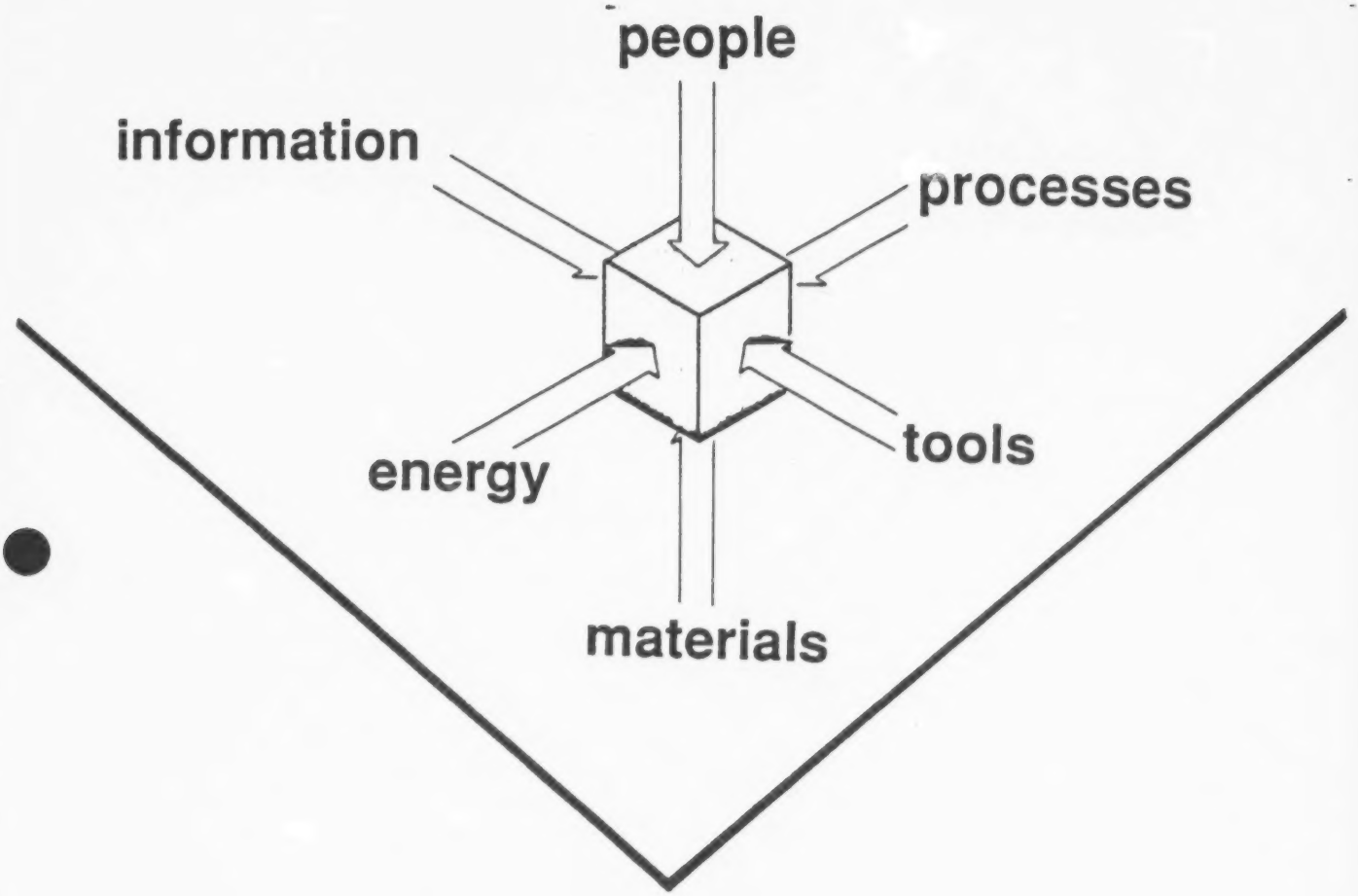
3) All materials generated are public property unless deemed original activities on the part of the staff.

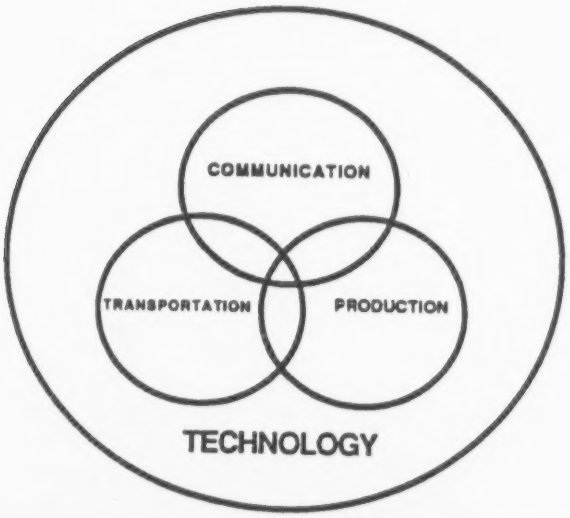
JUNIOR HIGH CURRICULUM

7th grade - Exploring Technology

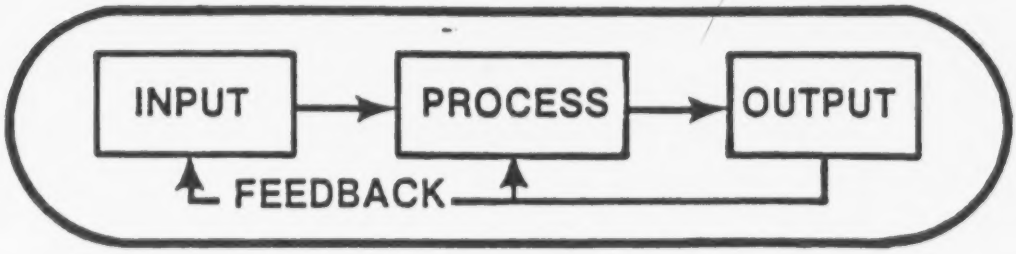


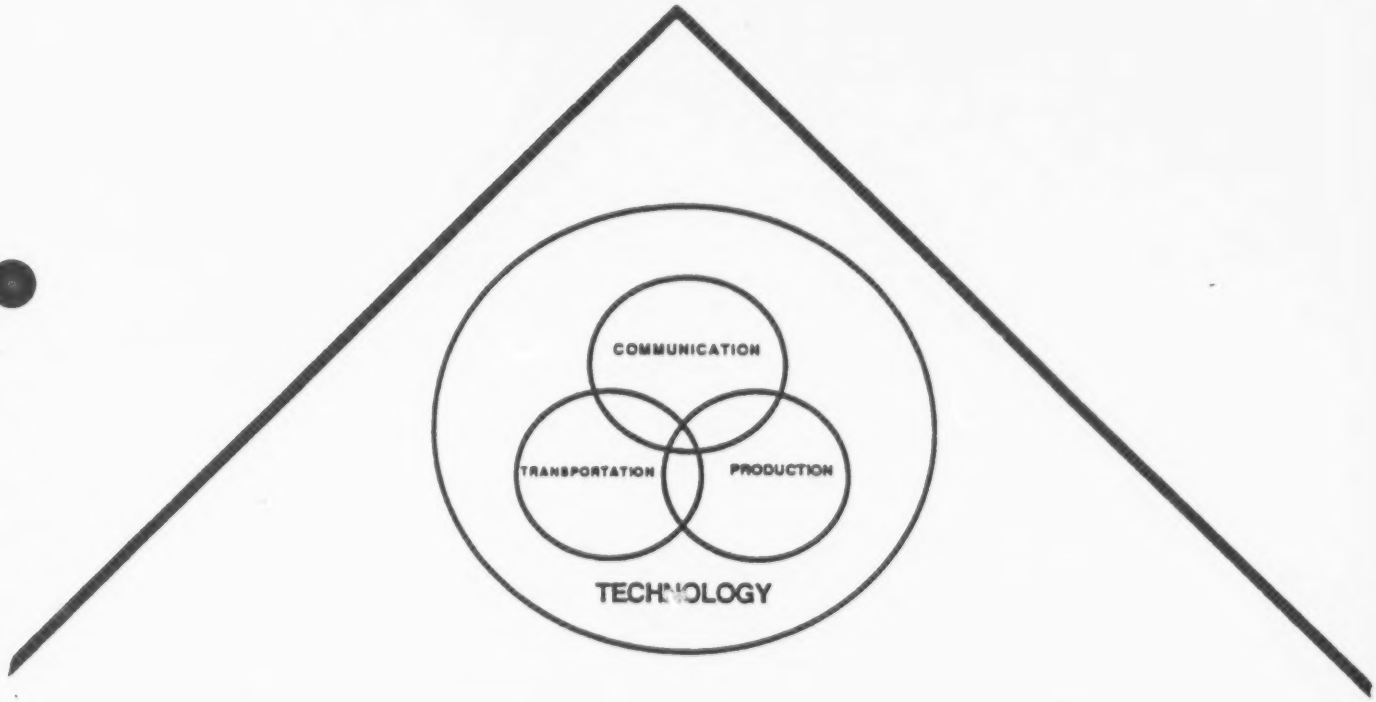
8th grade - Applying Technology 113

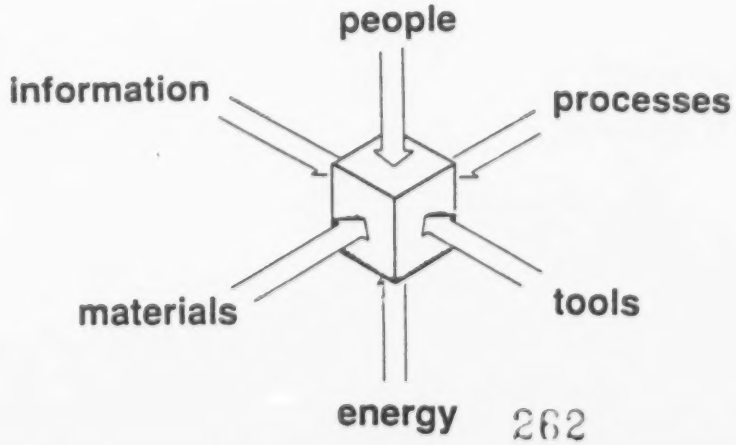




9th grade - Creating Technology 114







tek-ˈnäl-ə-jē ˌej-ə-ˈkā-shən

Technology Education is an integral part of the general education of each student. It applies problem solving activities and focuses on a systems approach to develop technological literacy. The technical systems of communication, transportation and production provide three broad content areas of study. This comprehensive activity based program is concerned with understanding the evolution, application and significance of technology on the individual and society.

For more information contact Project Open:

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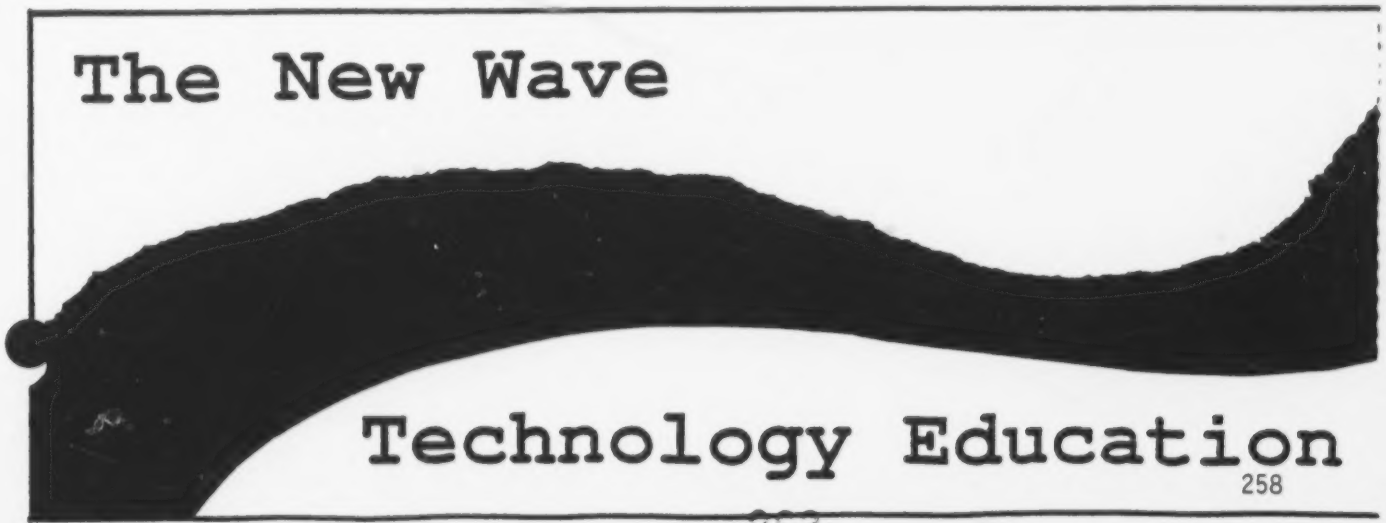
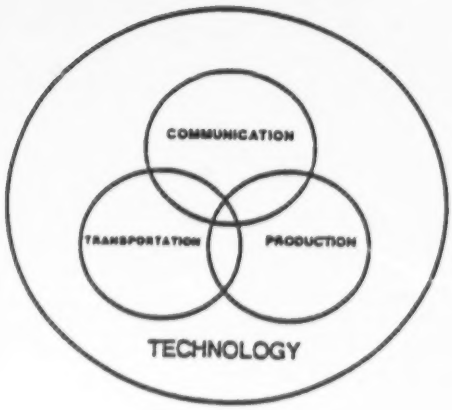
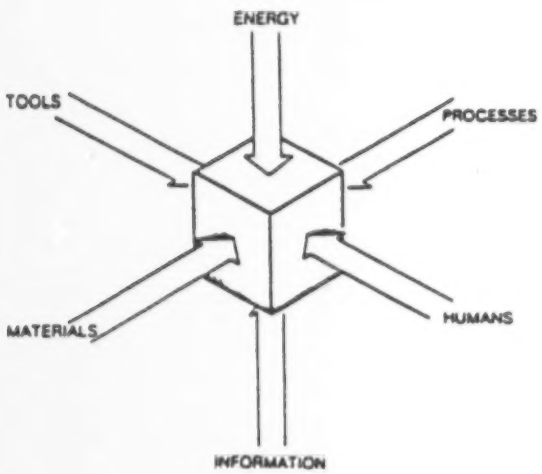
California, PA 15419



EXPLORING TECHNOLOGY

In the **seventh grade**, exploring technology will introduce you to the meaning of technology and how it affects your life. You will discover the technical systems of communication, transportation and production. Individual and group activities will provide interesting and exciting experiences as you explore each of these three areas.



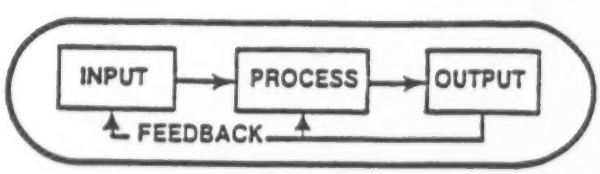


APPLYING TECHNOLOGY

For the **eighth grader**, applying technology will provide an in-depth look at the importance of the elements of technology, including: people, materials, tools, information, processes and energy. The importance of elements to the three technical systems will be examined through individual and group activities. You will participate in the design, development and creation of video productions, wooden structures, transport vehicles and other interesting activities, as you apply technology.

CREATING TECHNOLOGY

Creating Technology will provide **ninth graders** with the opportunity to apply knowledge and skills in communication, transportation and production to the establishment of an enterprise system. Your class will form a company which creates a product that you design, produce, package and sell. Profits from the enterprise will be used for a class activity.



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POTENTIAL COURSE TITLES

Brainstormed During Curriculum Planning Session
With Teachers at Canon-McMillan Senior High School

March 4, 1988

COMMUNICATION	PRODUCTION	TRANSPORTATION
Architectural drawing	Computer assisted manufacturing (CAM)	Transportation systems
Computer graphics	Manufacturing	Transportation
Drafting	Construction	Land
Sketching	Robotics	Space
Printreading	Research & development	Marine
Reprographics	Enterprise	Vehicle design
Technical illustration	Electro mechanical technology (EMT)	Mechanisms
Graphic communication	Structural design	Transportation system design
CADD	Production	Transportation modes
Visual communication	Maintenance	Control systems
Communication	Processing	Maps
Desktop publishing	Management	Conduit
Photocommunication	Automated manufacturing systems (AMS)	
Electronic communication	Computer integrated systems (CIM)	
Introduction to technical systems	Flexible manufacturing systems (FMS)	
Media	Services	
Electronics	Harvesting	
Computer drafting	Computer applications in production	
Solid state electronics	Shelter design	
Telecommunication		
Mass communication		
Microprocessors		
Technical writing		
Architectural design		
Analog digital electronics		
Visual thinking		
Technical sketching and drawing		
Video communication		

The Proposed Scope and Sequence for Technology Education at Canon-McMillan Senior High School

Communications	Production	Transportation
1. Computer Aided Drafting and Design	1. Computer Applications	1. Mechanisms
2. Electronic Communications	2. Shelter Engineering	2. Transportation System Designs
3. Architectural Design	3. Research & Design	3. Land-space Transportation Systems
4. Analog/Digital Electronics	4. Enterprise	4. Air-Marine Transportation Systems
5. Microprocessors	5. Computer Aided Manufacturing	
6. Photographic Techniques	6. Robotics	
7. Engineering Graphics	7. Manufacturing	
8. Graphics Communication	8. Construction	

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Canon-Macmillan Senior High School

FOUR-YEAR PLAN OF COURSE DEVELOPMENT
FOR
TECHNOLOGY EDUCATION

*New courses are in UPPER CASE letters

PHASE I 1988-89 (36-wk Courses)	PHASE II 1989-90 (18-wk Courses)	PHASE III 1990-91 (18-wk Courses)	PHASE IV 1991-92 (18-wk Courses)
Ind. Materials I	MANUFACTURING	MANUFACTURING	MANUFACTURING
	ENTERPRISE	ENTERPRISE	ENTERPRISE
Ind. Materials II	Ind. Materials II		
Ind. Materials III	Ind. Materials III	COMPUTER APPLICATIONS	COMPUTER APPLICATIONS
		COMPUTER ASST'D MFG	COMPUTER ASST'D MFG
			ROBOTICS
			RESEARCH & DEVELOPMENT
Electronics	ANALOG/DIGITAL	ANALOG/DIGITAL	ANALOG/DIGITAL
	ELECTRONIC COMMUNICA	ELECTRONIC COMMUNICA	ELECTRONIC COMMUNICA
			MICRO-PROCESSORS
Visual Comaunica I	ENGINEERING GRAPHICS	ENGINEERING GRAPHICS	ENGINEERING GRAPHICS
	GRAPHIC COMMUNICATION	GRAPHIC COMMUNICATION	GRAPHIC COMMUNICATION
Visual Comaunica II	Visual Comaunica II	PHOTO TECHNIQUES	PHOTO TECHNIQUES
Power Technology	Power Technology	MECHANISMS	MECHANISMS
		TRANSPORTATION SYSTEMS	TRANSPORTATION SYSTEMS
			LAND/SPACE TRANSPORT
			AIR/MARINE TRANSPORT
Home Maintenance	CONSTRUCTION TECHNOLOGY	CONSTRUCTION TECHNOLOGY	CONSTRUCTION TECHNOLOGY
Architectural Design	Architectural Design	SHELTER DESIGN	SHELTER DESIGN
Technical Drafting	ARCHITECTURAL C.A.D.	ARCHITECTURAL C.A.D.	ARCHITECTURAL C.A.D.
Engineering Drafting	ENGINEERING C.A.D.	ENGINEERING C.A.D.	ENGINEERING C.A.D.

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Canon-Macmillan Senior High School

FOUR-YEAR PLAN OF COURSE DEVELOPMENT
FOR
TECHNOLOGY EDUCATION

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Ind. Materials I	MANUFACTURING	MANUFACTURING	MANUFACTURING
	ENTERPRISE	ENTERPRISE	ENTERPRISE
Ind. Materials II	Ind. Materials II		
Ind. Materials III	Ind. Materials III	COMPUTER APPLICATIONS	COMPUTER APPLICATIONS
		COMPUTER ASST'D MFG	COMPUTER ASST'D MFG
			ROBOTICS
			RESEARCH & DEVELOPMENT
Electronics	ANALOG/DIGITAL	ANALOG/DIGITAL	ANALOG/DIGITAL
	ELECTRONIC COMMUNICA	ELECTRONIC COMMUNICA	ELECTRONIC COMMUNICA
			MICRO-PROCESSORS
Visual Communica I	ENGINEERING GRAPHICS	ENGINEERING GRAPHICS	ENGINEERING GRAPHICS
	GRAPHIC COMMUNICATION	GRAPHIC COMMUNICATION	GRAPHIC COMMUNICATION
Visual Communica II	Visual Communica II	PHOTO TECHNIQUES	PHOTO TECHNIQUES
Power Technology	Power Technology	MECHANISMS	MECHANISMS
		TRANSPORTATION SYSTEMS	TRANSPORTATION SYSTEMS
			LAND/SPACE TRANSPORT
			AIR/MARINE TRANSPORT
Home Maintenance	CONSTRUCTION TECHNOLOGY	CONSTRUCTION TECHNOLOGY	CONSTRUCTION TECHNOLOGY
Architectural Design	Architectural Design	SHELTER DESIGN	SHELTER DESIGN
Technical Drawing	ARCHITECTURAL C.A.D.	ARCHITECTURAL C.A.D.	ARCHITECTURAL C.A.D.
Engineering Drafting	ENGINEERING C.A.D.	ENGINEERING C.A.D.	ENGINEERING C.A.D.

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